THE UNIVERSITY OF ALBERTA

AN INVESTIGATION INTO THE USE OF THE STILL CAMERA AS AN EFFECTIVE MEANS OF ACCELERATING VISUAL PERCEPTUAL GROWTH

by

Allan Gratian Clovis

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE

OF MASTER OF EDUCATION

DEPARTMENT OF ELEMENTARY EDUCATION

EDMONTON, ALBERTA

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ABSTRACT

The purpose of this study was to investigate the effectiveness of the use of the still camera as a means for increasing the rate of visual perceptual growth, and to examine whether evaluation of children's visual information was facilitated by photographs which the children took themselves.

One grade six class of 22 students and a combination grade five and six class of 21 students, all from the same school, participated in the study. A program of studies was designed around three art learning areas: visual relationship between art and man-made environment, the visual as non-verbal communication, and relevant vocabulary. A test based on the program was designed by the investigator.

Subjects in the experimental group were provided with cameras and an adequate supply of film, and were required to photograph specific aspects of their environment. The subjects in the control group were provided with sketch pads and pencils and were required to sketch specific aspects of their environment. Each field session was succeeded by an evaluation session. The mean scores on the pre-test and post-test for the camera group and non-camera group were compared statistically to determine the extent to which use of the camera made a difference.

Altogether, it was found that only a small distinction existed between the performance of the camera group and non-camera group. The most interesting and significant finding, however, was made when the pre-test means and post-test means of the camera group were compared. There were significant gains made by subjects who had used the camera for the first time. It was also shown that those subjects in the non-camera group who had previous camera experience made significant gains on post-

test scores and their post-test scores were significantly higher than their peers in the non-camera group. Qualitatively, the subjects of the camera group used a wider range of viewpoints in recording visual stimuli, displayed more power in arranging visual forms, generally less stereotyped, and spent more time on evaluation and verbal interaction on their visual products.

The study provided some evidence that the rate of visual perceptual growth could be increased; however, it was cautioned that extended research time on different populations is needed before an increase in visual perceptual growth can be really ascertained.

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The writer wishes to express appreciation for all the assistance and co-operation of those who participated in the study and contributed to the writing of the report.

Special gratitude is expressed to the following:

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To fellow graduate students who contributed many hours with test construction and data analysis;

And finally, to my wife, Joanne, without whose encouragement and co-operation, this work could not have been undertaken.

Discussions with these persons, and with several other persons in the Department of Elementary Education and the Department of Art, resulted in the clarification of many of the ideas presented in the thesis.

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CHAPTER I

INTRODUCTION TO THE STUDY

THE PROBLEM

Many educators are convinced that our educational system should give paramount consideration to teaching towards creativity (Guilford, 1959; Lowenfeld, 1960; McFee, 1970; Miel, 1961). It thus becomes imperative to give attention to one factor in the creative process which has been identified as the 'departure point' for all other factors which, when integrated, constitute the creative act (Linderman and Herberholtz, 1964; Lowenfeld, 1960). Lowenfeld and Linderman identify this factor as sensitivity or awareness.

Awareness involves the letting in of the optimum amount of raw data in one's environment "so that the information can be processed and stored for use" (Linderman and Herberholtz, 1964, p.7). Awareness or sensitivity, taken out of context, can mean different things to different people. Some may err in thinking of it as merely massive reception, without realizing that the individual must actively respond to stimulation from the outer environment to complete the act. Arnheim equates this to visual perception and aptly describes the performance:

> Through that world roams the glance, directed by attention, focusing the narrow range of sharpest vision now on this, now on that spot, following the flight of a distant sea gull, scanning a tree to explore its shape (Arnheim, 1969, p.14).

It seems therefore, that any act of learning in art plays a minor role in making one realize the importance of awareness of the art elements in one's environment, and the organization of these elements, through perception.

This research concerns itself with a specific area of visual perception. It explores one method by which one may help children develop highly differentiated visual percepts; ways by which they may become more visually aware of their environment, so that they will constantly employ perceptual cues of observing, identifying, relating, distinguishing and discriminating. In order to make meaningful strides in visual perceptual development and intensify one's perceptions of one's environment, one must engage in this type of constant perceptual exploration and evaluation of one's visual information. This study attempts to find out whether these activities, the exploration and the evaluation, are facilitated by the technological possibilities of the still camera, as opposed to more traditional media and methods.

A review of some curriculum guides for art was made (Department of Education, Alberta, 1969; Board of Education, Chicago, 1966; Fla. Public Schools, Miami, Fla., 1965; St. Catherine's Public School, Ontario, 1966; Department of Education, Saskatchewan, 1966; Tacoma Public Schools, Washington, 1965; Department of Education, New Brunswick, 1965; Pasadena School District, California, 1965), to see, firstly, whether any part of the course outline for the elementary school contained specific lessons directed towards increasing visual perceptual awareness; and secondly, to discover, were this the case, whether any provision was made for the use of a camera by children to record their percepts. Some attention was given to developing visual awareness, with the exception of a few, these guides did not spell out specifically that children will make use of cameras for the art activity.

The Elementary Art Curriculum Guide, published by the Department of Education for Alberta Schools (1969), aims at assisting the child in

becoming "visually sensitive" (p.4). One sub-heading entitled "visual experiences" states how the child will gain these experiences:

> ..... through the employment of field trips, classroom museums, reproductions of works of art, slides, movies and work of his own (p.5).

A suggestion is contained in the section under Perceptual Development for Grades Five to Six for "collection of photographs" for the study of some elements in Art (p.17). This indirect use of the camera is a good sign, but the means are very remote from dealing with the child's perceptions. Besides, most of these photographs would likely be taken by adults, and it is time that children examine some of their own percepts via the photographic medium.

WHY THE CAMERA

Vincent Lanier, the Head of the Department of Art Education at the University of Oregon, Eugene, and chief advocate of the uses of newer media in the art class wrote recently:

> To this generation of school children, cameras ... are just as 'natural' tools as crayons were for the teacher's generation (Lanier, 1969, p.314).

And as a tool of technology, the camera helps the child to communicate in a way that he is not able to do when using the crayon. The camera is an important tool in visual literacy training, as it "... forces the child to concentrate on something - if only for a few seconds - in an effort to really see it" (Fransecky, 1966, p.29). Lanier reminds us "that film fulfills more adequately the input requirements of today's youngsters" (Lanier, 1969, p.316). Marshall McLuhan, in his examination of what is happening to man in this age of technological speed-up, wonders whether we are not trying to accomplish today's tasks with yesterday's

tools (McLuhan, 1967). This is not to say that the traditional media used in art classes have nothing to offer, but only that art educators, who provide directives for curriculum building, can certainly make more use of the photographic medium in their programs.

If still cameras were placed in the hands of children, they should be able to make recordings, more easily than with traditional media, of the visual events and aesthetic phenomena in their environment. Not just for the fun of taking pictures, but for the fascination and intense involvement that would be derived from being able to re-examine, alone and in groups, the kinds of things looked at; and from isolating and evaluating their visual percepts. After all, "Evaluation becomes very critical, because without it the inner demands of the individual remain diffuse and his self-motivation to deeper levels of knowledge and involvement is likely to diminish" (Linderman and Herberholtz, p.19). This kind of activity is pregnant with possibilities for facilitating visual perceptual development.

PURPOSE OF THE STUDY

The purpose of this study was threefold:

1. To investigate the possibility of increasing the rate of visual perceptual growth.
2. To investigate whether visual perceptual exploration is facilitated by the use of the still camera.
3. To investigate whether evaluation of children's visual information is facilitated by photographs taken by the children themselves.

SIGNIFICANCE OF THE STUDY

Should this study find that the use of the still camera is an effective means of accelerating visual perceptual growth, then it is hoped that a school system, in an attempt to meet the visual needs of the child, will undertake a pilot project in art education whose purpose will be of a similar nature.

A study of this kind will, hopefully, re-emphasize the technological advantages of the camera over traditional media, in the area of developing visual perceptual awareness, and will introduce the camera as a legitimate tool for the art class.

The major content of most art education programs in the Elementary Schools is founded on the assumption that the child has already learned to look at his world. Whether this assumption is true or not, art education programs, in general, reflect great haste over the art production aspect and neglect to design adequate activities based upon the exploration of the environment. Should the child engage in this type of visual enquiry, he should increase his reserves of idea sources for transferring and translating into any visual art form, whether painting or sculpture.

DEFINITIONS

The following five terms are defined operationally for the purposes of this investigation. Terms not introduced here are defined in the context where they occur.

Aesthetic phenomena - When a viewer is perceiving visual form in any situation at any given time, there are certain forces at work.

Varieties of visual forms exist in our natural and man-made surroundings. The moment at which the viewer brings the dormant aesthetic potential in his environment to life by actualizing it, becomes aesthetic. The aesthetic phenomena are the effects produced by the merger of two things; one, those visual forms which the mind takes note of directly, and two, the aesthetic response those forms evoke.

Newer Media - Any materials and newer technological devices which are manipulated, seen or heard, such as cameras, televisions, programmed learning materials, and tape recorders.

Percept - A percept is different from the retinal image. The sensory information undergoes progressive encoding on its way to the cortex, and thereafter may be recycled in the apprehension of subsequent stimuli. The sorting out of this information results in a percept, a kind of mental impression.

Sensitivity - This means a high degree of awareness of a material or a situation. In art, the term has been used interchangeably with "awareness" and "perception," and it involves the act of processing and storing any perceptual information. Visual sensitivity, visual awareness, or visual perception, involves the ability to discriminate, to recognize, to relate or to identify. As such, it is more than an optical process.

Visual literacy - This is the ability to arrange and order items in one's visual environment in order to convey a kind of structure and an underlying idea, and also the ability to understand these visual ideas.

HYPOTHESES

Nine null hypotheses were developed in order to deal statistically with the problem at hand. The scores referred to in the hypotheses are derived from an instrument developed by the investigator.

Hypothesis 1. No significant differences will be found in the post-test scores between the experimental group and the control group.

Hypothesis 2. No significant differences will be found in the post-test scores between those members of the experimental group who have had some prior experience with cameras and those who have had no prior experience with cameras.

Hypothesis 3. No significant differences will be found in the post-test scores between those members of the control group who have had some prior experience with cameras and those who have had no prior experience with cameras.

Hypothesis 4. No significant differences will be found in post-test scores between those members of the experimental group who have had some prior special art training experience and those who have had no prior special art training experience.

Hypothesis 5. No significant differences will be found in post-test scores between those members of the control group who have had some prior special art training experience and those who have had no prior special art training experience.

Hypothesis 6. No significant differences will be found between the pre-test scores and post-test scores of those members of the experimental group who had prior experience with cameras.

Hypothesis 7. No significant differences will be found between the pre-test scores and post-test scores of those members of the experi-

mental group who had no prior experience with cameras.

Hypothesis 8. No significant differences will be found between the pre-test scores and post-test scores of those members of the control group who had prior experience with cameras.

Hypothesis 9. No significant differences will be found between the pre-test scores and post-test scores of those members of the control group who had no prior experience with cameras.

In addition, the following questions will be investigated on a qualitative basis:

1. Is there a positive relationship between the abilities of the camera group and the non-camera group to record and comprehend a variety of viewpoints of any object?

2. Do children experience conflict between actual observations and the ability to sketch or photograph?

3. Does conflict for the child who experiences difficulty in sketching result in a kind of perceptual stereotype?

4. Does the camera help in breaking through these stereotypes and motivate the child to further visual exploration of the objects?

LIMITATIONS

The following limitations of the study are to be noted:

1. The population used by the study was limited to ten, eleven and twelve year old children in one school in the Edmonton Public School System.

2. The nature of the sample restricts the extent to which one can generalize to a larger population.

3. The features of the test designed by the investigator cannot

be compared with other similar measures, as none is available at the moment.

4. Any positive results cannot provide directives, but only new ways to look at present problems in art education.

SUMMARY

Creative teaching is teaching which fosters in the student, a capacity for increasing visual and perceptual awareness. Artistic awareness - i.e. an individual's trained response on a particular level - can open up an individual's awareness on a wider level, so that he may learn to respond to his environment as he responds to the specific subject, art. Teaching today should employ today's tools in approaching educational needs; the camera is a tool which should be used to foster individual concentration, visual sensitivity, and evaluation by the individual of the whole process of perception.

In this study, an attempt is made to investigate whether it is possible to increase the rate of visual perceptual growth; whether visual perceptual exploration can be facilitated by the children's use of the still camera, and of photographs taken by the children themselves. Hopefully, the findings and assertions of this study could be utilized in a pilot project in the schools, despite the admitted limitations imposed upon the study by the limited nature of the samples used.

CHAPTER II

REVIEW OF THE LITERATURE

Adequate information exists to assume that there is such a thing as visual perceptual development. This involves changes in the way we perceive things visually. However, even though much research has been done in the area of visual perception, only a very small portion has been centered around how it can be developed. It is important to note that most of the research in the area of visual perception in general has based its findings on observations of children's drawings, or on how children performed on some tests devised by the investigators (Attneave, 1954; Arnheim, 1954). Arnheim devotes a chapter in Art and Visual Perception to the question of visual perceptual growth. Generally, children's drawings were used as the basis for analysis.

The extensive use of children's drawings as the source from which one gathers information on children's perceptual abilities, involves an inherent problem, which will be discussed at a later point in this chapter. Nevertheless, the views presented here on visual perception are those which this investigator finds most relevant to the study. Much consideration will also be given to the area of visual education and visual literacy. And since the use of the camera is instrumental in the design of the investigation, a section on photography and photography in art education research and practice is also contained in this chapter.

ON VISUAL PERCEPTION

To talk about visual perception is tantamount to engaging in an endless discourse. Not only is it endless in the sense that a host of

social scientists have addressed themselves to the subject, but current research is also rendering some traditional theories less useful than others. Of the many theories that have been developed in the attempt to explain visual perception, the Gestalt theory, Piaget's theory, cell-assembly theory and McFee's 'perception-delineation' theory seem to bear more relevance than others to art education, if only because they have had more direct implications for the visual arts. In addition, valuable suggestions have been made by some art educators who address themselves more directly and explicitly to art teachers in the classroom. Earl Linderman and Donald Herberholtz provide some testimony of their own contribution in their book entitled Developing Artistic and Perceptual Awareness, (1964).

In his book, Art and Visual Perception, (1954), Arnheim strengthens his position by refuting other established notions, namely, the suggestion that children are technically unable to draw or paint what they perceive, and the intellectualist theory that children draw what they know. Arnheim's claim is that children draw what they see.

When dealing with the idea that children lack motor skills, Arnheim at first agrees that "drawings of young children show incomplete motor control" (Arnheim, 1954, p.127). However, he soon qualifies this statement by noting that if many similar drawings are compared, the lines are usually sufficiently accurate "... to indicate what the drawing is supposed to be like" (Arnheim, 1954, p.127). He adds that drawings by adults lacking in motor skills are different from drawings of children. Continuing this line of argument, he concludes that lack of technical ability cannot explain why children draw the way they do.

While one may agree with this conclusion when it stands alone, the intervening argument is generally weak. Firstly, in an attempt to

qualify his original statement, Arnheim becomes self contradictory. In this instance, an inference is made that one can make sense out of nonsense by reading meaningful lines into a drawing. Secondly, he compares the results of drawings by adults lacking motor skills with those of children, without cautioning that adults may have very different percepts from those of children.

Arnheim's refutation of the intellectualist theory is somewhat more convincing. The intellectualist subscribes to the notion that the mind of man is engaged in conscious acts of judgment as it seeks the correct idea of an object. Judgment and formation of correct ideas are intellect processes, and hence, an idea central to the intellectualist doctrine is that the child draws what he knows rather than what he sees. Arnheim claims that during the early stages in the development of the mind, sensory experiences play a dominant role, and the process of judgment of the visual sensations takes place at the perceptual level. However, in his latest book, Visual Thinking, Arnheim revokes his criticism of Helmholtz, a representative of nineteenth century thinking on perception, when he admits that the judgment process observed in logical thinking also occurs in the perceptual domain. So the intellectualist theory popularized by Helmholtz in the 1860's was rejected by Arnheim in the early 1950's and towards the late 1960's, Arnheim was led to believe, by further reflection on Helmholtz' writings, that the latter had no intention of intellectualizing perception. Thus, Arnheim no longer thought of the intellectualist as maintaining a perceptual intellectual dichotomy.

After attempting to weaken the two positions that:

1. Children were technically unable to draw what they perceived, and

2. that children drew what they knew rather than what they perceived, Arnheim proposed that children drew what they saw.

The major line of his thesis is that vision alone does not discriminate changes that occur on the size and shape of objects when the elements of distance come into play.

> Most objects are seen approximately in their objective shape and size: a rectangular suitcase looks rectangular, and distant persons in a room look no smaller than those close to the observer. It is quite difficult for many persons to visualize the workings of perspective, even when it is demonstrated to them with a yardstick (Arnheim, 1954, p.131).

Arnheim therefore concluded that if vision is so uninfluenced by perspective and children's drawings at an early stage also showed little influence of perspective, then children drew what they saw.

Perception for Arnheim consists in the formation of perceptual concepts. These perceptual concepts are the offsprings of a kind of visual problem-solving situation. Let us take as an example the instance at which the individual sees a flower; he cannot use the exact shape of the flower to represent it, so he invents a shape or shapes to embody the integral features of the structure of the flower, and these features satisfy in general the individual's perception of that class of flower. These visual concepts are equivalent to percepts upon which the child calls to do a painting or drawing. Hence, a child's drawings should only be thought of in terms of his percepts.

Gestalt's theory assumes these percepts to be initially very generalized and simplified, and that, as the individual continues to interact visually with his environment, his percepts become gradually differentiated. This becomes evident, as early drawings made by children have an almost organic unfolding as they evolve from very simple forms to

more complex ones. It is at this juncture that Arnheim accounts for changes in visual perceptual behaviour by claiming that there is a shift from the simple to the complex.

And so, when one sees something, one is also assigning it to a place in the whole and some location in space or point in time brings that thing into existence. Therefore, every act of seeing demands some form of discrimination or visual judgment. This visual judgment is immediate and cannot be separated from the act of seeing itself. In his book entitled Visual Thinking (1969), Arnheim suggests that the cognitive operations called thinking are basic to the perceptual process just as they are to the mental process. He claims that thought processes operate in principle in perception. Visual perception is regarded as an intelligent activity or as "visual thinking."

> Intelligent behaviour in a particular sensory area depends on how articulate are the data in that medium. It is necessary, but not sufficient, that the data offers a rich variety of qualities (Arnheim, 1969, p.17).

Arnheim is convinced that vision reigns supreme among the sensory inputs and consequently contributes the greatest share to intelligence. Whereas smell and taste do offer a rich variety of qualities, Arnheim believes that one can only indulge in them, but not think in them. The medium of touch receives a higher rating except for the fact that the length of time one would take to discern the shape of an object by touching it, could be reduced considerably by taking one glance at that object. The sense of hearing is rated second to vision. Arnheim believes that "thinking of the highest level takes place in music" (Arnheim, 1969, p.18), but this is restricted to the musical world. He feels that audible information about the rest of the physical world is limited. Vision, he claims, is not only a highly articulate medium, but it provides man with an

unlimited wealth of information about events in his world (Arnheim, 1969, p.18).

Donald O. Hebb offers a theory that is diametrically opposed to the Gestalt theory (Hebb, 1949). Hebb's theory is based on the assumption that a particular perception depends on the excitation of particular cells at some point in the central nervous system, whereas Arnheim's argument relies on the assumption that when an individual sees a simple figure as a triangle, he perceives it immediately as a distinctive whole, without relying on prior recognition of its distinctive parts. If to perceive a triangle is as simple as it seems to us, then Hebb has no argument with Gestalt's theory. But, if perception is a cumulative process, then perception theory in general requires renewed attention.

Hebb relies heavily on his own experimental research and that of Senden (Hebb, 1949). The latter worked with patients who suffered from congenital blindness. When their sight was restored by operation, they experienced the same perceptual phenomena as babies, only that they were able to describe what they saw.

From the studies conducted, Hebb was led to believe that one gradually learns to identify and recognize basic shapes such as circles, squares or triangles. This ability to recognize comes after an individual has been able to see an object from multiple viewpoints. The view from each angle or each vantage point is considered a fixation. Each view or each fixation triggers a certain number of cells in the cortex; this is decoded into a simple visual impression or a simple percept. For the purposes of his theory, Hebb calls this a simple cell assembly. A cell assembly can also be thought of as a component. Given sufficient time to visually explore an object from a variety of viewpoints and in different

settings, (so that the eye moves from one fixation point to another) an individual develops several simple cell assemblies or components into a system to form a cell assembly system. In time, cell assembly systems bridge each other through electrochemical action, only to facilitate in the storage and recovery of the visual data. The result can be thought of as the modern printed circuit with a network of systems. In this instance, it is a compound of cell assemblies or a complex percept. At the stage where the object makes effective a constant neural pattern regardless of the context in which it is seen, Hebb says that the observer has acquired a perceptual constancy or visual concept. He also claims that initial acquisition of perceptual constancies takes time and a high degree of involvement in the perceptual exploration activity. Once some rudimentary visual concepts are formed, and because of the unique fashion in which the cell assembly systems facilitate each other within the network, later perceptual learning benefits, and the rate of perceptual development accelerates with age and new visual experiences.

Jean Piaget (1956) contends that children pass through three major stages in perceptual development during the first two years of their lives. Through the first four to five months, the child learns topological spatial relationships. He comes to know the relative proximity of objects, he recognizes a simple order of things and sees boundaries that exist, and can see whether things are separated or united. The child enters the second stage where he remains until he is about one year old. During this time, he is governed by what he sees as he tries to coordinate his visual world with his tactile world. The increased visual and tactile activity enables him to visualize things in perspective, to see straight lines, angles and curves, and also leads to the discovery of

some permanence in the shape and size of objects. He continues to indulge in further sensory activity during the third stage and proceeds to make internal connections with his actions and sensory impressions. This activity gives birth to a kind of conceptual image and beyond this point perceptual and conceptual growth takes place in a cumulative fashion.

Although June King McFee (McFee, 1961) subscribes in some part to the Gestalt notion of visual perception, supporting the generalization that perceptual development moves from wholes to parts, she ventures further to develop the "perception delineation" theory, which is a model of visual and artistic thinking in action. Since thinking, which is a function of the intellect, is involved in artistic expression, McFee's P.D. Theory explains the function performed by this intellectual structure.

The P.D. Theory attempts to account for artistic behaviour in terms of the assumption that perception is an information-handling process governed by set and prior experience. Once a subject has been part of an experience requiring a certain task, he would have had to devise some means of dealing with that task. In so doing, he would learn how to respond to that particular situation. This learning would equip the subject with a response set, which he inevitably uses when faced with another problem-solving encounter. All individuals possess a battery of sets which determine to a large extent how they will respond to their environment. Set formation is one method the organism uses to reduce the perceptual work load.

James F. Wise, Chairman of the Department of Fine Arts at Virginia State College, suggests that one can teach certain mental or psychological sets, which, if adopted by the student, "will determine the perceptual cues to which he will respond in any given situation" (Wise, 1970,

p.19). Arthur Efland (1967), in a careful examination of the set theory, felt that if sets could be taught at all, then art teachers should be attempting to foster the children's ability to take on appropriate sets. Wise warns, in his article cited above, that empirical testing of set theory has not yet been undertaken to determine its validity as a means of increasing perceptual awareness. McFee also cautions that use of these response-sets alone prevents one from seeing the visual qualities of things. The individual who reaps the optimum value from any perceptual activity is the one who employs a mixture of response sets with actual visual qualities when attending to objects in his environment.

Arnheim's theory does help to explain the nature of child art, but has severe limitations in that it fails to account for the manner in which perceptual growth occurs. Very briefly, Arnheim suggests that adults have more highly differentiated percepts than children. The lack of explanation as to how these percepts are acquired, may mislead one into assuming that these differences in percepts were automatically acquired with age. On the other hand, the theories offered by Donald Hebb and Jean Piaget do explain growth. They both place more emphasis on the perceptual activity itself. Although McFee subscribes to Arnheim's wholes-to-parts notion, she brings to the area of perception another dimension; i.e., set theory, which attempts to explain how the individual handles his perceptual data.

One must question, however, the validity of a response one receives when a child is asked to draw or paint a man. It seems likely that the results will be the child's solution to transferring a voluminous form into a flat surface, using drawing or painting as the medium. Can one safely make inferences from a medium requiring so much technical

skill, especially since these inferences have such far reaching consequences? There must be more reliable ways of finding out how the child perceives, and it is here that the camera may come to the rescue. All in all, these theories are of fundamental importance to the art of children. The views held on developing visual percepts and the perceptual ability on the whole are very pertinent as any knowledge on the subject would affect an interpretation of the nature and speed with which visual perception is developed.

VISUAL PERCEPTION AND CREATIVE GROWTH

In their book entitled, Developing Artistic and Perceptual Awareness (1964), Earl Linderman and Donald Herberholtz make an extremely rich presentation of practical suggestions for enlivening art programs in the elementary school. These authors, both involved in artistic production and creative teaching, waste no words in stating precisely what kinds of activities the child may engage in, and offer a variety of approaches that can be adapted to any elementary curriculum. Like Viktor Lowenfeld (Lowenfeld, 1960), Linderman and Herberholtz were ultimately concerned with the creative growth of the individual. Before any creative growth can begin to take place, they felt that the initial input stage which was considered as artistic awareness or sensitivity, had to be developed to the maximum. Lowenfeld once stated:

> Whatever you can do to encourage your child in his sensitive use of his eyes, ears, fingers and entire body will increase his reservoir of experience and thus help him in his art (Lowenfeld, 1960, p.26).

Creative growth can only take place through greater awareness.

The basic notion underlying Linderman and Herberholtz's book is that any early stimulation of the child's sensory mechanism can only serve

as an agent in freeing the child's creative power. In keeping with this premise, education's major task should be to develop the child's perceptual facilities to the fullest. Herbert Read (1944) makes reference to refining the use of the senses. His concern, however, was mainly with the discipline involved in perceiving more qualitative detail than the casual observer would observe.

These art educators have all acknowledged some form of perceptual training as a necessary condition for creative growth. It has also been implied that children who have not been given any form of training would, in all probability, not be as aware and sensitive to situations as their counterparts who received some training. Also, if perceptual abilities are learned as research done to date indicates, then some methods for teaching for perceptual growth would obviously yield greater results than others. Let it be understood that visual perception itself only occurs when the individual responds. His response would be a sort of testimony that he has internally experienced a situation. This makes the act of perception phenomenal, and as such, it is impossible to teach perception, so the most one can do is to teach for perception.

ON PHOTOGRAPHY

Although periods in the history of art are not as defined as some art historians would indicate, from time to time artists have been known to give prominence to one or more elements in their painting. The nineteenth century found painters preoccupied with light and light sources. It is without coincidence, therefore, that a machine for recording light patterns was invented in the nineteenth century. Ever since its invention, the chief function of the camera was to capture and preserve images

at some point in time. And so, in the 1870's when Eadweard Muybridge was able to capture a series of images of animals and humans in motion, and France's Degas coupled photography with his paintings, many traditional notions on perception of motion were shattered. Man's perceptions of motion have been corrected and enriched ever since the advent of the camera.

Today, while photography continues to serve other arts, it has, with the help of such people as Alfred Eisenstaedt and Henri Cartier-Bresson, developed into a major art itself. Recognition of photography as a major art has been given by such ambitious art houses as The Museum of Modern Art in New York and New York's Hallmark Gallery. In February and March of 1971, the latter offered "France: A Photographic Essay by Henri Cartier-Bresson." Time and Saturday Review had nothing but praise to offer in their coverage of the event. Cartier-Bresson himself was very conscious of the part played by photographs in perceiving the outer world. Photography involves for him, "the recognition of a fact in a fraction of a second and the rigorous arrangement of the forms visually perceived which give to that fact, expression and significance." (Saturday Review, Feb., 1971, p.47).

Those concerned with education and art education seem somehow to be the last ones to take action. While some private industries work consistently at refining the performance of the camera and reducing its price and other industries employ photographers to present the best side of their products with astounding visual impact (let alone financial success), it was not until the last decade that education programs in general began to acknowledge this visual avenue as one which holds great promise. One wonders why the emphasis on visual education was so long in coming,

when some educators were convinced since the turn of the century, that vision accounted for most of human learning.

ON VISUAL EDUCATION

Visual education is no panacea to cure all the ills affecting the learning process today, but it is proving itself a useful adjunct to this process. The director of the Instructional Media Centre at St. Mary's School for the Deaf in Buffalo, New York, Joseph R. Piccolino, has been experimenting with the camera, a basic component in the hardware of visual education. Piccolino designed a program whose aim was " ... to help deaf youngsters communicate their perceptions of their environment and gain new language skills" (Audiovisual Instruction, Nov., 1969, p.47). The fact that a similar program is being pursued by the St. Mary's School for the Deaf today, is a tribute to the success of the new dimension to the learning process which photography has facilitated. John Comba, a doctoral student in administration of special education programs at the University of Oregon, Eugene, was involved in a program called "Project See" at a Junior High School in Whitefish, Montana, for the 1968-69 school year (Audiovisual Instruction, Nov., 1969, pp.66-67). "Project See" had its roots in a program executed the previous year, in which extensive use was made of new media, and of photography in particular, to provide learning situations for a Junior High class labelled "educable mentally retarded children" whose I.Q.'s ranged from 50 to 70. Comba, in describing the progress made by "Project See," reflected on the universally held assumption that there were many channels to learning, and "photography can become one of these, especially for children with problems" (p.67). Many other educators share this view today (Ruth La Pott, A.V. Instruction,

1968, pp.477-479; Grade Teacher, Nov., 1969, pp.81-82).

In the spring of 1970, the Arts and Crafts and Research Departments of the Board of Education for the City of Toronto conducted a study in visual perception. A group of nine and ten year old children from Blake Street Public School, in East end Toronto, was selected. The major purpose of the study was "to observe the ability of a group of children to produce a creative response to their environment" (Educational Media, Dec., 1970, p.8). The children were all provided with Polaroid cameras and an unlimited supply of film and flashbulbs. The project itself lasted ten weeks. During the first half of this period, the children were taken beyond the school walls and allowed to take pictures of any subject in their environment. On the fifth week, photographs and art prints were introduced as stimuli at strategic points in the school. It was felt then that the children's sensitivity would rise sharply during the initial weeks and level off shortly before the stimuli were introduced. The investigators anticipated a similar rise in sensitivity in the second half of the project after the introduction of the photographs and prints with another levelling off towards the end of the tenth week.

Of the numerous things that have been reported to date on that project, four things were emphasized:

1. The children looked at things they never noticed before.
2. Their use of language was affected, as there was a great need for verbal articulation of their visuals;
3. Their self concept was greatly boosted,and
4. The children's capacity for aesthetic response to their environment was increased.

In addition, in the latter part of 1969, a group of pre-schoolers

at the Early Childhood Centre in Rochester, New York were provided with some Kodak Instamatic cameras and some Super 8 mm. movie cameras (Preschool Children, December, 1970). One of the aims of that exercise was to gain some insight into how the child chooses to arrange his visual world in terms of the new medium. A report on this project suggests that the subjects generally became more discriminating of such visual properties as form, size, shape, texture, and perspective.

Like the Toronto project in the spring of 1970, other projects have been undertaken, making use of the photographic medium as a means of developing language skills (Ruth LaPolt, "A New Approach to Visual and Written Sequencing," Audiovisual Instruction, May, 1968). All results pointed to the camera as "a vital tool in written and oral composition with primary children" (p.479). Credit was also attributed to the camera for overall enrichment in the children's vocabulary.

Much of the informal, yet effective, education is carried out by communications media reaching out-of-school people of all ages. Most of this education comes through the lens of the camera. McLuhan (1967) reminds us that it is a contemporary medium and one with which children of today are familiar. The whole field of art education involves having children respond to their environment by making use of visual forms. Research in the area of visual perception strongly suggests that perceptual abilities are also learned. The camera may prove to be a legitimate tool for facilitating the visual perceptual development necessary for anyone involved in an art program.

SUMMARY

Debate concerning the nature of perception and the perceptual process in the individual is fraught with contradictions. However, it does seem feasible to claim that, if we cannot actually teach perception (since we are still unsure of the exact nature of this process), we can certainly develop methods of teaching for perception. The camera remains a tool for such creative teaching.

Educators have too long ignored the educational resources, as yet not fully tapped, in the camera. Too much attention has been paid to the camera as a commercial, rather than an educational unit. Experiments have proven that children equipped with cameras and film, and encouraged to explore their environment, have shown a definite increase in awareness of what they see; vocal articulation of what was seen; self-confidence; as well as the capacity for artistic response. Photography should not only be regarded as a major art form. If we accept the fact that vision is basic to the greatest percentage of human learning, can we continue to ignore the camera as an essential tool in the necessary process of visual education?

CHAPTER III

DESIGN OF THE STUDY

The purpose of this chapter is to describe the sample, instruments, procedure and statistical analysis of data used in this study.

THE SAMPLE

The subjects for this study were fifty-four Grade V and VI children. This sample consisted of one Grade VI class and one Grade V and VI class from the Lansdowne Elementary School in the Edmonton Public School System. The school was officially made available to the investigator in the month of May, 1971.

The writer elected to use this sample in view of certain practical considerations. Firstly, each member of the group of children using cameras should have access to a camera and an adequate supply of film. This condition was made necessary by the very nature of the study and in definite terms determined the number of subjects to be using cameras. These subjects were to be all members of one regular art class. In the months preceding the study, many fruitless attempts were made to procure inexpensive cameras by means other than purchasing them outright. Success was only gained locally when the Department of Elementary Education at the University of Alberta made fifteen Kodak Instamatic cameras available for use in the study. At least ten more cameras were needed and this became another influencing factor in determining which Grade VI class in the public school system should be selected. The chances were good that children attending Lansdowne School would have a camera of their own or be able to borrow one from another member of the household. In addition, the art

teacher at Lansdowne not only expressed an interest in the program, but also possessed the training and competence necessary to assist in carrying out the study efficiently, having done graduate work in art education.

Finally, two classes from the Lansdowne School were used; one made use of cameras, while the other sketched. There were twenty-six subjects in the Grade V and VI class, which was the camera group, and twenty-eight subjects in the non-camera Grade VI group. Of the 26 and 28, 21 and 22 respectively participated in the entire study. The remainder of subjects were absent for one or more of the sessions.

The investigator feels that it was safe to compare a combination Grade V and VI with a straight Grade VI class for two reasons. Firstly, to assume that one year difference in the children's capacity is going to make a difference is doubtful. Secondly, in this case, both classes received similar art instruction over the last two years.

The area in which the Lansdowne School is located is one of Edmonton's relatively new residential areas. In the 1961 census, Lansdowne was defined within an enumeration area about ten times its own size, and the population for that area was then 156. By 1966, with the population shift towards the periphery of the city, the population rose to 1,478. It is inappropriate to use the 1961 census rating to describe the area and so the writer has relied heavily on informal knowledge of the area. The children involved in the study came from homes in which the parents' position ranged from bank managers to well-to-do businessmen, teachers, university professors and graduate students. The 1966 census revealed that the population consisted largely of young married couples. This population has probably doubled in the last five years.

CONTENT DESIGN

Figure 1 illustrates the content around which the course of study for the research was designed. There were two major areas of visual perceptual learning, derived in part from Anderson's areas of art learning (Anderson, 1965).

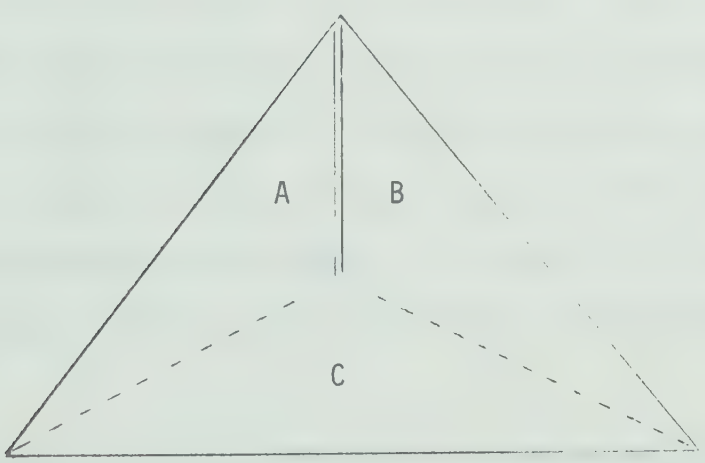
(a) visual relationships between Art and man-made objects, and

(b) the visual as non-verbal communication: Signs and Symbols of the City.

A third area which was more inclusive rather than exclusive was:

(c) Developing a working vocabulary for areas (a) and (b).

Figure 1.



INSTRUMENTATION

Test Construction

An important feature of this study was the construction of a test using photographs to evaluate the visual perceptual abilities of children between ten and twelve years of age.

Thirty questions were formulated using groups of four to five photographs and amounting to a total of one hundred and thirty-one prints. The questions were based on the areas of study delineated in the preceding section on Content Design. A correct response required a selection ranging from one to all of the photos in any set. In another situation each photograph was treated as an individual item and was scored against the total number of photographs (See Appendix C).

Test Validation

Two staff members from the Department of Art and two graduate students in Art Education at the University of Alberta were asked to determine the extent to which the questions to each test item were measuring the characteristics for which they were designed. These experts were presented with a scoring sheet which contained a five interval rating scale ranging from low to high validity for each test item. Space was also provided for general comments. With the exception of minor changes in the wording of the questions, twenty-five of the thirty questions were found to be acceptable to the judges. The other five items provoked some debate, with the resulting form of the final test reflecting a consensus of opinion.

The questions which stimulated discussion and resulted in major changes are presented here (See Appendix C for visual test items).

Question 5: Three of four judges felt that item 18, which is a picture of the instruments panel of a car should be included as a correct response. It was argued, however, by the fourth judge and the researcher himself that, although the circular instrument in the lower left corner faintly suggests the image of a clock, the photograph itself lacked

adequate definition to be counted as a clock without leaving some doubt in the viewer's mind. A compromise was arrived at and item 18 in question Number 5 was counted as an optional response. Therefore, either the combination of 19 and 21 or the combination of 18, 19 and 21 was considered as a correct response.

Question 8: This question asked in which of the four photographs were circular shapes repeated to form a pattern. One judge was initially reluctant in agreeing that only item 31 and 34 fulfilled the requirements. Item 32 and 33 also had a repetition of circular shapes but these did not form a pattern as required.

Question 14: One judge's first comment to this question was that item 59 qualified as a correct response. After re-reading the question, she agreed that the design of the house itself did not make use of the basic square shape.

Question 28: It was pointed out after some reflection by one judge that youth considers speed and power as being synonymous. The remainder of the committee accepted this and thus, item 116 qualified along with item 114 as the correct responses.

Question 30: The wording of this question underwent more changes than any other. The original question was as follows:

Which of these pictures clearly illustrates rhythm or movement? Two judges demonstrated that rhythm was evident in item 127, 130, and 131, whereas the response that the investigator sought was item 127 only. This question was changed several times before it took its present form.

It was the consensus of the four judges in the field of art and art education that the overall face validity of the test was high.

RELIABILITY

A measure of reliability was recorded (See Appendix B). This measure was established by the Kuder-Richardson procedure. The analysis was made at three stages:

(a) pilot study phase

(b) pre-test scores

(c) post-test scores

A difficulty index was also determined for each test item at all of the above stages.

PILOT STUDY

A pilot study was executed during the month of March, 1971. None of the participants were involved in any way with the main study itself, but they were representative of the subjects in the main study in that they were members of a Grade VI class and from the same school system. The pilot group was composed of six students from the top half of a Grade VI class and six from the bottom half of the same class. In making the request, the investigator, in conjunction with the home room teacher used overall general ability in determining who comprised the top and bottom half of the class. The subjects of the pilot study were then required to take the test designed by the investigator. The main purposes of the pilot study were to determine:

1. The appropriateness of the vocabulary and sentence structure in presenting the problem explicitly;
2. The children's ability to understand the test items;
3. The approximate time needed to complete all the test items;
4. Suitable administrative procedure;

5. An item difficulty index;

6. The Kuder-Richardson Formula[20] reliability co-efficient.

Once the pilot study was completed and an assessment was made of the results, it was decided that:

1. The vocabulary and sentence structure would not be revised in spite of the fact that four of the twelve children in the pilot study consistently asked for an explanation of certain concepts such as vertical, authority or symbol. Verbal concepts were to form part of the learning experience for the children involved in the main study and it was felt that at the end of the main study, children would be more verbally and visually fluent.

2. Apart from the vocabulary barrier which existed for a few children, some subjects expressed concern about Question 1 and Question 11 (See Appendix C). In Question 1, the concern was over whether one must know there is a circle in the picture or whether one can see the circle. Items 2 and 3 in Question 1 and item 48 in Question 11 fell into this category. On the basis of McFee's statement (op. cit. Chapter II), that one who employs a mixture of response sets with actual visual qualities when attending to objects reaps the optimum from any perceptual activity, it was felt that children, in arriving at decisions on what was being perceived, would have to rely to a certain extent on what was known of the object. The writer, in collaboration with some of the judges, felt that the perceptual training program would assist the child in making these decisions. Consequently, the question was left unaltered.

3. Children in the pilot study took between twenty-five and thirty-two minutes to complete the test. As a result of this performance, the time limit set on the test for the main study was thirty minutes.

4. No special administrative problems arose. Procedures for administering the test were similar to those involved in multiple choice tests with which the children had prior experience.

5. A difficulty index was determined for each test item (See difficulty index table - Appendix B).

6. A reliability co-efficient of .87 was yielded by the item analysis. Further reference was made to this value in Chapter IV.

PROCEDURE FOR COLLECTING DATA

Both groups were made aware that they were going to be involved in a project. Also, since the two classes were in the same school, subjects were deliberately informed that each project was different from the other. It was felt that this would reduce the "spill factor." Every child in the camera group either had a camera or was provided with a Kodak Instamatic camera. One hundred rolls of Kodak 126 film were made available. This worked out to an average of two rolls of film or twenty-four exposures per child per session. The cameras were introduced into the classroom one week before the study began in an attempt to neutralize any glamorous response they might provoke. At this stage, some basic rules of photography were discussed with the participants.

Both groups, the camera group and the non-camera group, were subjected to the same range of experiences, only that the camera group used cameras during their field sessions, and their own photographs for the evaluation sessions, while the non-camera group made use of sketch pads and pencils or crayons and their own sketches. The field sessions involved exploring prescribed areas in the city of Edmonton. The area specifically used for providing the opportunity to find relationships between art and

man-made objects was within a one-mile radius of Lansdowne School. A section of downtown Edmonton was designated for providing the content for the area "signs and symbols of the city". Each field session alternated with an evaluation session. There were four sessions altogether, each session lasting for two continuous hours and being six school days apart.

The pre-test was administered one week ahead of the study and the post-test one week succeeding the final session. Apart from a brief additional questionnaire accompanying the post-test, both tests were identical. One week after the post-test was completed, eight subjects from the camera group and seven subjects from the non-camera group were interviewed. The interview was designed to fulfill the following objectives.

1. To determine each subject's ability to perform the task of recognizing objects from varying viewpoints (using photographs). Twenty-four of the children's own photographs were used, and two seconds were allowed to recognize each photo.

2. To record the preferences each subject had for photographs taken from varying vantage points. This task made use of thirty-five photographs taken by the children themselves. These were organized in sets or groups and each child was required to rank the pictures in order of preference.

3. To discuss problems, if any, experienced in recording percepts.

The regular art teacher in conjunction with the writer shared the teaching responsibility during the course of the study. In addition to daily consultation with the co-operating teacher, some guidelines were committed to paper (See Appendix A).

STATISTICAL ANALYSIS

Hypotheses 1, 2, 3, 4, 5, 6, 7, 8 and 9 were subjected to a one-way analysis of covariance with the pre-test scores as covariate and post-test scores as criterion measure. For hypotheses 1, 2, 3, 4 and 5, this type of analysis allowed the investigator to study the performance of the two groups by making any adjustments necessary for the control variable. The analysis also produced an F-ratio with an associated probability rating.

For hypotheses 6, 7, 8 and 9, this type of analysis allowed the investigator to study the performance of each sub-group on their pre-test mean score and post-test mean score. In this instance, the analysis also produced a t-value with an associated probability rating. The conventional .05 level of significance was used as the basis for rejecting or accepting the hypotheses.

A difficulty index was determined for each item at all phases in the administration of the test. An internal reliability measure was also recorded at each phase using the Kuder-Richardson-20 procedure.

CHAPTER IV

RESULTS OF THE INVESTIGATION

The results of the statistical analysis for testing the hypotheses are reported in this chapter. Findings are also presented for each of the additional questions designed around the qualitative experiences of both the camera and non-camera groups.

Hypotheses 1, 2, 3, 4, and 5 were tested using a one-way analysis of covariance with the pre-test scores as the covariate and the post-test scores as the criterion. An analysis of covariance permitted the writer to study the performance of two groups which were unequal with regard to an important variable - the control variable - by making adjustments for that variable. It can be thought of as determining the scope of the relationship between the control variable and the criterion variable. Each criterion score is statistically readjusted to compensate for any control variable disparity that may exist between the independent groups. An F value is also obtained in the usual fashion.

Hypotheses 6, 7, 8, and 9 were also tested using a one-way analysis of covariance with the pre-test scores as the covariate and the post-test scores as the criterion. Most important, however, was the t-value produced. This value was used to judge whether the difference between the means on the pre-test and post-test in each instance, was a significant departure from differences which might have occurred by chance alone. An associated probability rating was also provided.

The computer program for analysis of covariance was documented and tested by the Division of Educational Research Services at the University of Alberta. The investigator followed this program to obtain

the results needed which were calculated by the IBM 360/67 computer.

STATISTICAL ANALYSIS OF THE HYPOTHESES

Hypothesis 1 restated: No significant difference will be found in the post-test scores between the experimental group and the control group.

An analysis of post-test scores in which each group was equated on its respective pre-test scores showed no significant differences between the groups. The analysis produced an F ratio of .33. The unadjusted means for the experimental (camera) group and the control (non-camera) group were 103.66 and 106.22 respectively, whereas the adjusted means were 104.07 and 105.83 respectively. Table I presents more detailed information. On the basis of the results of their analysis, Hypothesis 1 was accepted.

TABLE I

Analysis of Covariance of Experimental and Control Groups' Post-Test Performance

(Hypothesis 1)

Source of Variation	Adjusted Analysis			
	Degrees of Freedom	Mean Square	F	P
Between Groups	1	32.73	.97	.33
Within Groups	40	33.72		

Hypothesis 2 restated: No significant difference will be found in post-test scores between those members of the experimental group who

have had some prior experience with cameras and those who have had no prior experience with cameras.

An analysis of post-test scores on which adjustments were made for each group for pre-test disparity showed no significant differences between the groups. The analysis produced an F ratio of .23 which has an associated probability of .63. The unadjusted means for the group with prior camera experience and no prior camera experience were 104.00 and 103.12 respectively, whereas the adjusted means were 103.18 and 104.44 respectively. Table II presents more detailed information. On the basis of the results of this analysis, Hypothesis 2 was accepted.

TABLE II

Analysis of Covariance

(Hypothesis 2)

Source of Variation	Adjusted Analysis Degrees of Freedom	Mean Square	F	P
Between Groups	1	77.51	.23	.63
Within Groups	18	32.11		

Hypothesis 3 restated: No significant difference will be found in post-test scores between those members of the control group who have had some prior experience with cameras and those who have had no prior experience with cameras.

An analysis of post-test scores on which adjustments were made for each group to control for pre-test disparity showed significant differences between the groups in favour of the camera group. The analysis

produced an F ratio of .67 which has an associated probability of .01. The unadjusted means for the group with prior camera experience and no prior camera experience were 107.58 and 98.59 respectively, whereas the adjusted means were 107.63 and 98.44 respectively. Table III presents more detailed information. On the basis of the result of this analysis, Hypothesis 3 was rejected.

TABLE III

Analysis of Covariance

(Hypothesis 3)

Source of Variation	Adjusted Analysis Degrees of Freedom	Mean Square	F	P
Between Groups	1	107.63	.67	.01
Within Groups	19	98.44		

Hypothesis 4 restated: No significant difference will be found in post-test scores between those members of the experimental group who have had some prior special art training experience and those who have had no prior special art training experience.

An analysis of covariance for Hypothesis 4 was not warranted as it was found that only one subject received prior special art training.

Hypothesis 5 restated: No significant difference will be found in post-test scores between those members of the control group who have had some prior special art training experience and those who have had no prior special art training experience.

Like Hypothesis 4, an analysis of covariance for Hypothesis 5 was not warranted as it was found that only one subject received prior special art training.

Hypothesis 6 restated: No significant difference will be found between the pre-test scores and post-test scores of those members of the experimental group who had prior experience with cameras. The mean score on the pre-test, 97.69, when compared with the mean score on the post-test, 104.00 produced a t-value of -1.512 with an associated probability of 0.143. Consequently, on the basis of these results, Hypothesis 6 was accepted.

Hypothesis 7 restated: No significant difference will be found between the pre-test scores and post-test scores of those members of the experimental group who had no prior experience with cameras. When the mean score on the pre-test (92.75) of this sub-group was judged against the mean score on the post-test (103.12), a t-value of -2.281 was produced with an associated probability of 0.038. This analysis showed a significant difference between the mean score of the pre-test and post-test, beyond the .05 level and consequently, Hypothesis 7 was rejected.

Hypothesis 8 restated: No significant difference will be found between the pre-test scores and post-test scores of those members of the control group who had prior experience with cameras. When the mean score on the pre-test (98.29) was compared with the mean score on the post-test (107.59), a t-value of -3.312 with an associated probability of 0.002 was produced. This analysis showed a significant difference between the mean score of the pre-test and post-test, far beyond the .05 level, and consequently, Hypothesis 8 was rejected.

Hypothesis 9 restated: No significant difference will be found between the pre-test scores and post-test scores of those members of the control group who had no prior experience with cameras. When the mean score on the pre-test (96.20) was compared with the mean score on the post-test (101.60), a t-value of -1.128 with an associated probability of 0.256 was produced. This analysis showed no significant differences between the mean score of the pre-test and post-test, and consequently, Hypothesis 9 was accepted.

Table IV presents a summary of the analyses for Hypotheses 6, 7, 8, and 9.

TABLE IV

Comparison of Results Attained by Experimental Group and Control Group With Prior Camera Experience and No Prior Camera Experience on Two Instances

a) Pre-Test
b) Post-Test

Hypothesis	Mean Score Pre-test	Mean Score Post-test	t-value	Probability
6 - Experimental Group with prior experience with cameras.	97.69	104.00	-1.512	0.143
7 - Experimental Group with no prior experience with cameras.	92.75	103.12	-2.281	0.038 *
8 - Control Group with prior experience with cameras.	98.29	107.59	-3.312	0.002 **
9 - Control Group with no prior experience with cameras.	96.20	101.60	-1.128	0.291

* significant at .05 level
** significant at .01 level

RESULTS OF THE TEST ANALYSIS

The reliability measure yielded by the K-R 20 procedure shifted from .87 on Pilot to .80 on Pre-test to .78 on Post-test. More detailed information is presented in the following Table V.

TABLE V

Reliability Measure

Test	KR-20 Reliability	Test Mean	Variance
Pilot	.87	67.25	106.02
Pre-Test	.80	97.52	89.43
Post-Test	.78	104.13	72.25

An item difficulty index is presented in Appendix B. Fifty-five percent of the items registered a decrease in difficulty from Pilot Study to Post-Test. This decrease was usually more noticeable between Pilot Test and Pre-Test as opposed to a smoother transition from Pre-Test to Post-Test.

The high frequency of correct responses for individual items might have had some influence on the high Kuder-Richardson-20 reliability figures.

The sudden decrease in difficulty from Pilot Study to Main Study (Table VI) might be a function of the following:

(a) There was a small number of subjects involved in the Pilot Study.

(b) There were differences in the nature of prior instruction

in art received by the Pilot group and the Main study group. Subjects in the Main study were in an art class taught by an art teacher, whereas subjects in the Pilot Study were taught by their home room teacher who had no special art training, i.e., the subjects of the main study had a more highly developed knowledge of art, e.g. vocabulary.

TABLE VI

Distribution of Difficulty Index

	Pilot	Pre Test	Post Test
.900 to 1.000	21	49	51
.800 to .899	13	24	35
.700 to .799	8	20	11
.600 to .699	9	16	13
.500 to .599	18	9	9
.400 to .499	9	7	6
.300 to .399	13	3	4
.200 to .299	14	1	1
.100 to .199	15	2	1
.000 to .099	1	0	0
TOTAL	131	131	131

THE QUALITATIVE EXPERIENCE

Question 1 restated:

What kindsof relationships exist between the abilities of the camera group and non-camera group to record and comprehend a variety of viewpoints of any object?

In an attempt to answer this question, the investigator sorted out about one hundred photographs from a total of over one thousand, and about fifty sketches from a total of around two hundred and fifty. Viewpoints of both photographs and drawings were classified as being taken from:

1. Extremely close-up,
2. Close-up,
3. Medium shot,
4. Long shot,
5. Above eye level,
6. Below eye level, and
7. Taken at an angle placing the object in perspective.

All in all, few drawings fell into categories 5, 6, and 7. It was also difficult to determine whether sketches were taken from close-up or far back as the majority lacked reference points. Sketches made showing objects at an angle were also rare. With few exceptions, most sketches were flat, presenting a full frontal view, or profile, of the object. Some of these drawings are present in succeeding pages.

On the other hand, the subjects in the camera group took pictures from the whole range of viewpoints. Although about fifty percent of the photographs taken were in the medium shot and long shot categories,

students using the camera seemed to exercise much more power in arranging visual forms from a variety of vantage points. And so, pictures taken looking directly down at an object or up at another or extremely close up at another was not an uncommon thing. It is important to note that the degree of interest generated and displayed by each group was a common factor, and if any group had to qualify for appearing more attentive, the non-camera group would certainly have done so. On some occasions, I asked students in the non-camera group why they spent so much time re-examining a certain object, only to receive the reply that they were not really looking at the object as much as they were busy trying to decide how to sketch it. Consequently, judging from the number of visual recordings made by both groups, the camera group was able to produce not only a greater number of visual recordings, but also pictures with a wider variety of viewpoints. However, when members of each group were asked to perform a simple recognition task towards the end of the study, no differences were found in the level of their performance.

Question 2 restated:

Do children experience conflict between actual observations and ability to sketch or photograph?

In response to a question administered at the time of the post-test which asked, "On the two occasions that you went out sketching, did you find this of any help to you in recording the object in which you became interested?" One-third of the respondents felt that sketching was helpful; the others responded in the negative. The following are actual remarks made by some members of the non-camera group when they seemed faced with a problem: "I can't draw a slant line," and "This doesn't look right ... I guess I can put it here anyway." Most members of the

non-camera group experienced varying degrees of difficulty in getting their drawings to correspond with their observations. This problem was non-existent as far as the camera group was concerned.

Question 3 restated:

Does conflict for the child who experiences difficulty in sketching result in a kind of perceptual stereotype?

This is difficult to determine, although some of the sketches seem to suggest a kind of stereotyped way of perceiving an object. However, in the follow-up interview, some children in the non-camera group were asked to make choices between pictures taken of objects in the stereotyped fashion and those of objects from varying angles. Some admitted to preferring the stereotyped view as they thought it made a "nicer" picture.

The question which arises from this question is, 'How close can a child's drawings and his selection of certain types of photographs among others be to his actual perceptions?' The observations made during the course of this study with respect to the sketches produced provide some evidence to suggest that children who experience difficulty in sketching may develop a kind of perceptual stereotype which impedes visual perceptual growth.

Question 4 restated:

Does the camera help in breaking through these stereotypes and motivate the child to further visual exploration of objects?

The children using cameras took little time overcoming any doubts they might have had with respect to their ability to photograph subject matter existing in their environment. Once confidence had been established, there was no limit to the angles the children chose in shooting

their pictures. This sort of activity provided the children with new ways of seeing things, some of which they had never seen before. Also, it was evident (more so with the photographs than with the sketches) that the children using cameras were acquiring new ways of attending to stimuli in the environment. These results seem to indicate that the camera may assist the child in breaking through stereotyped behaviour by providing him with a host of alternatives, consequently whetting the child's appetite for further visual exploration.

It would be a serious omission not to mention here the degree and quality of interaction which took place during the evaluation sessions. Photographs on the pages that follow present more evidence than any verbal phrasing can accomplish. The members of the camera group worked at a distinct advantage, as their photographs were easily recalled by peers. Children wanted to spend so much time with their photographs that the one hundred and ten minute art period never seemed adequate. More verbal exchange emerged from this heightened interaction than the non-camera group ever achieved.

The photographs and drawings which appear on the following pages lend more insight to the degree and quality of interaction which existed throughout the study. Basically they can be considered under two main categories which were outlined in Chapter III, under the sub-heading of content design:

(a) the visual relationship between art and man-made objects; and

(b) The visual as non-verbal communication: Signs and Symbols of the City.

Pages 52 to 55 cover the first area of visual perceptual learning (a), while pages 56 to 57 cover the second area (b). Some reference was made to the original questions raised to assist the researcher in describing the qualitative experience. It was felt that these pages add visual substance to the foregoing generalizations made when the writer attended to these questions.

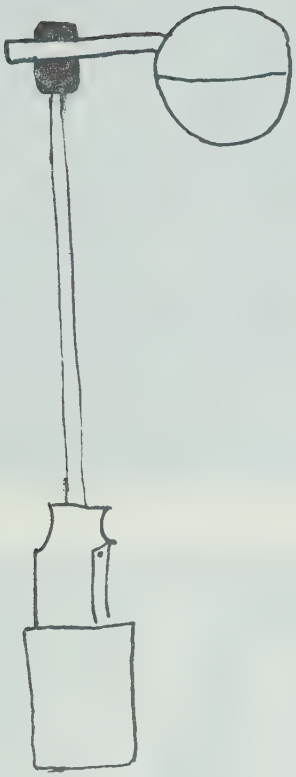
The visual relationship between art and man-made objects: Page 52 shows three photos of children on the scne recording their percepts, using the traditional means of drawing. These are contrasted with one photo of a girl using the camera.

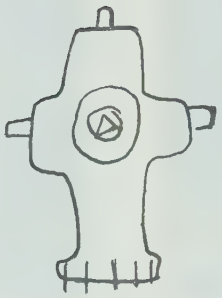
Drawings and photographs are shown on pages 53, 54, and 55. It becomes apparent here that the photographic recordings provided the subjects with an opportunity to re-examine a wider variety of viewpoints (Question 1). The photographs readily supply a greater source for the study of man-made structural patterns created by the interplay of lines and shapes.

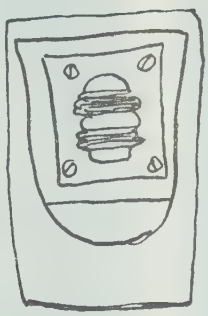
The reality of voluminous quality on a flat surface is captured with greater success by the photograph, whereas the drawings are reduced to representational lines. The photograph obviously provided the child with more information about these everyday environmental structures which the children might pass by otherwise.

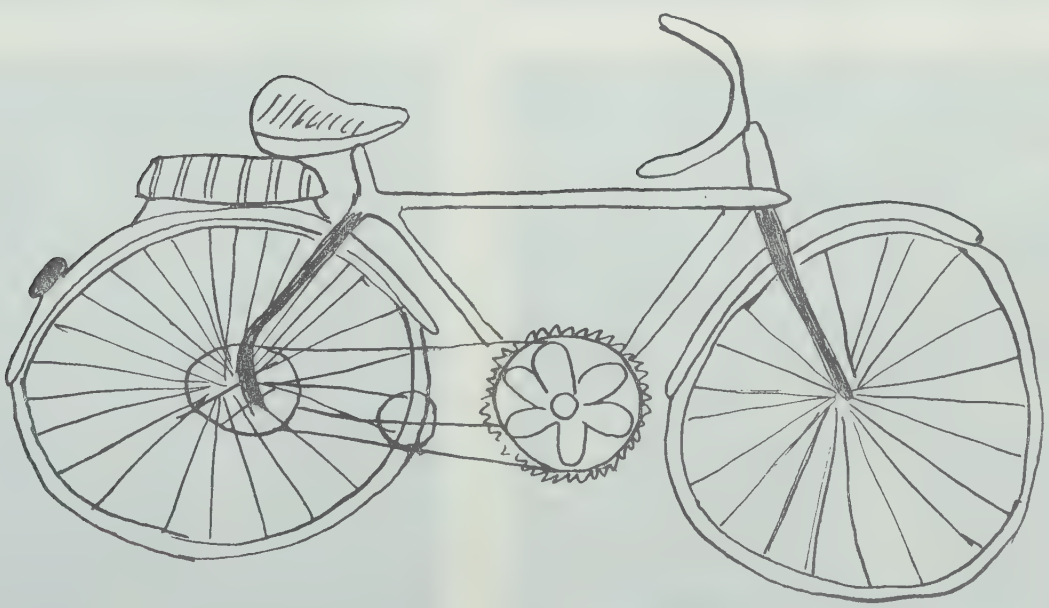
The visual as non-verbal communication: Signs and Symbols of the City: Drawings and photographs on pages 56 and 57 give some indication of the kinds of signs and symbols which the children became conscious of during the study. Symbols of authority as exemplified in the national flag and the emergency light on the city police car occurred quite frequently.

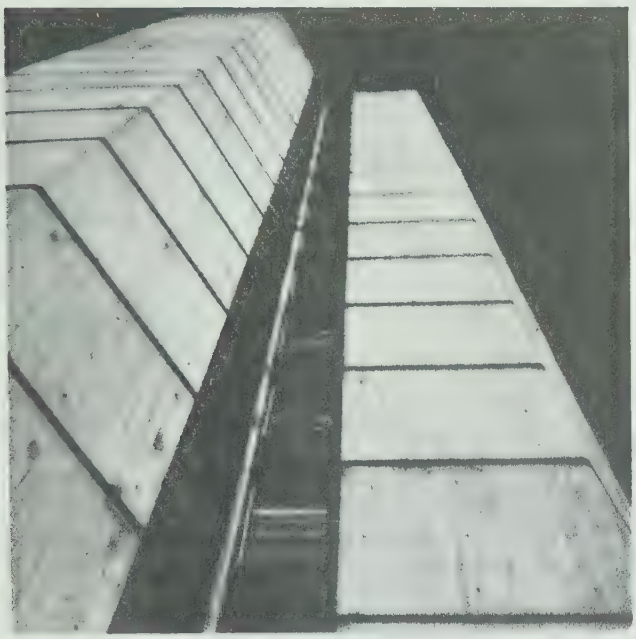
The picture at the top right of page 57 and all those on page 58 reveal the interest generated by the photos and drawings during the evaluation sessions. Whereas the field sessions were designed to engage the subjects in searching out the art elements of line and shape, and recognizing how these elements function to produce visual composition and meaning in their environment, the evaluation sessions were more of an analytical, reflective nature. Analysis and classification became the salient feature during this period. Again the photographs made available to the experimental group a richer source of visual information. This was a distinct advantage afforded by the use of the camera.

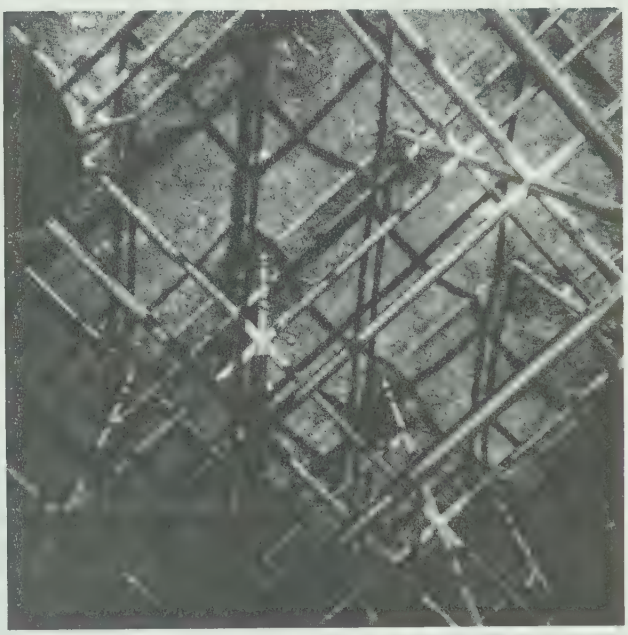


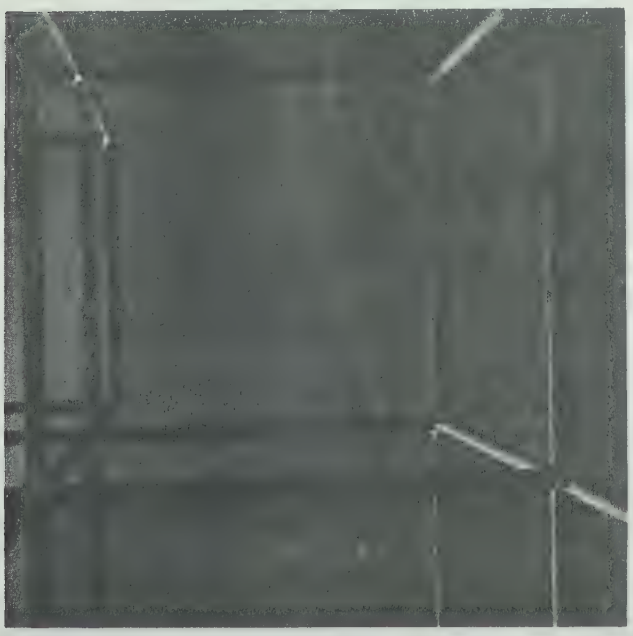


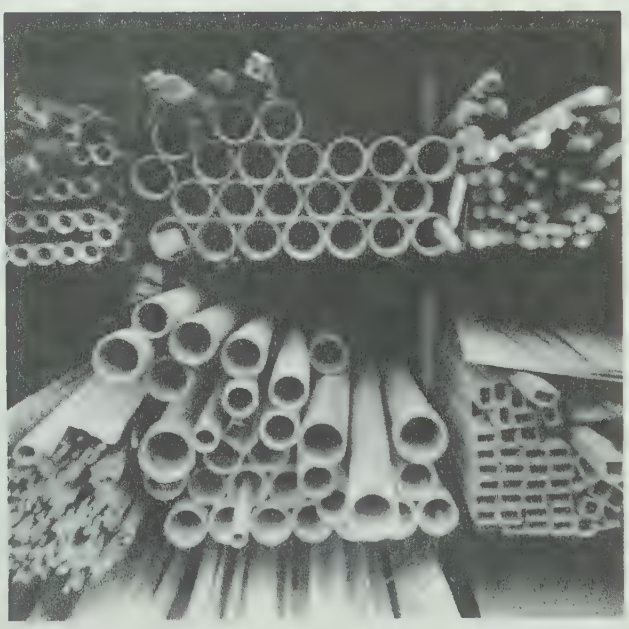


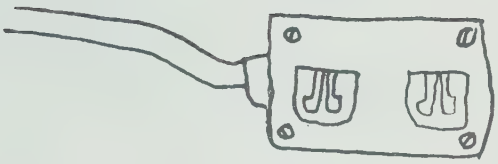


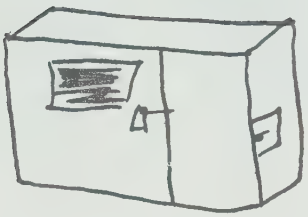


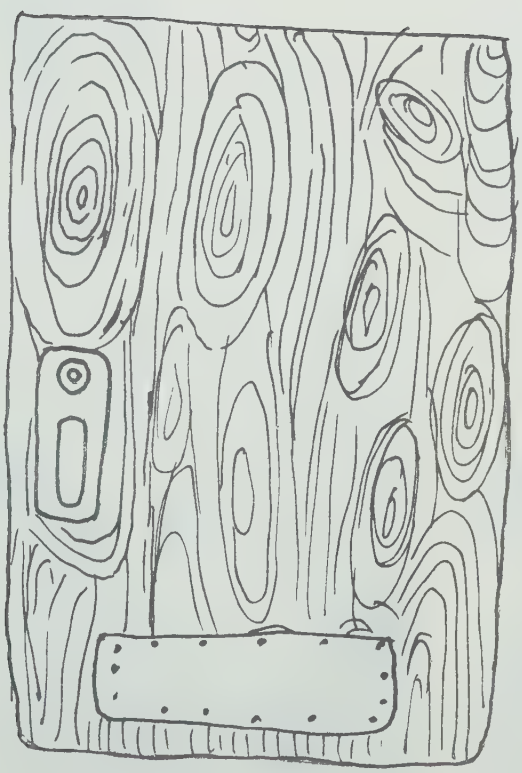


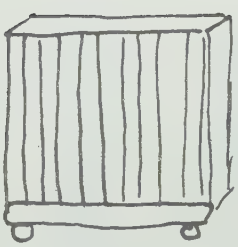


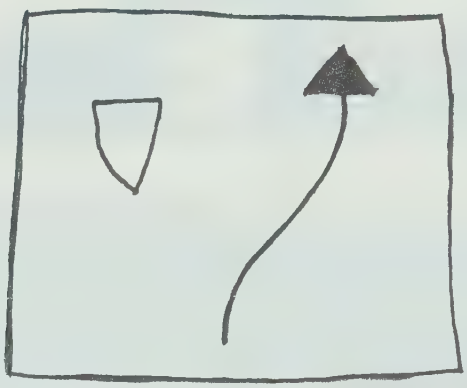










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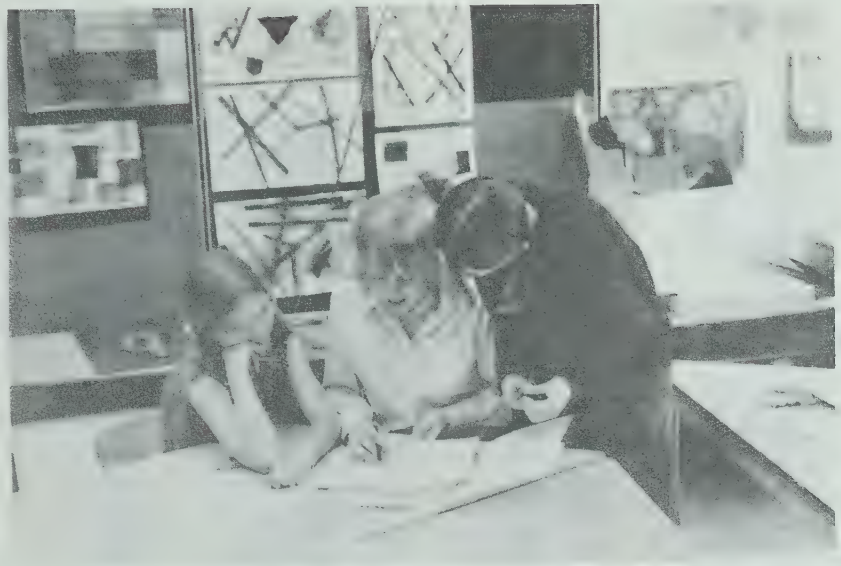

SUMMARY

Hypothesis 1 examined the possibility of the existence of a significant difference in performance between the camera group and the non-camera group on a test in visual perception designed by the investigator. It was found that no significant difference existed between these groups and consequently, this hypothesis was accepted.

Hypothesis 2 compared those members of the camera group who had prior camera experience with those who had no prior experience in an attempt to unconver any difference in their level of performance on the same test. It turned out that no significant difference existed between these groups either, so Hypothesis 2 was also accepted.

Hypothesis 3 also was concerned with subjects who had prior camera experience as opposed to those who had no prior camera experience within the non-camera group. On the basis of the results of the analysis, Hypothesis 3 was rejected as there were significant differences in post-test mean scores between those members of the control group who had prior experience with cameras and those who had no prior experience with cameras.

Hypotheses 4 and 5 were not submitted for analysis since the small number of subjects who actually received prior art training did not warrant it.

Hypotheses 6, 7, 8, and 9 were all concerned with comparing the mean score on pre-test and post-test of both experimental and control groups, and of subjects who had prior experience and no prior experience with cameras.

Hypothesis 6 compared the means of the pre-test scores and post-

test scores of those members of the experimental group who had prior experience with cameras. It turned out that no significant differences existed between these means scores and consequently, this null hypothesis was accepted.

Hypothesis 7 compared the mean score on the pre-test and the post-test of those members of the experimental group who had no prior experience with cameras. On the basis of the results of the analysis, null hypothesis 7 was rejected as there was a significant gain made in the mean score of the post-test over the mean score of the pre-test.

Hypothesis 8 compared the means of the pre-test scores and post-test scores of those of the control group who had prior experience with cameras. It was found that a significant gain was made in the mean score of the post-test over the mean score of the pre-test and consequently null hypothesis 8 was rejected.

Hypothesis 9 compared the means of the pre-test scores and post-test scores of those members of the control group who had no prior experience with cameras. No significant difference was found between these mean scores and thus this null hypothesis was accepted.

Of the nine hypotheses originally proposed, seven of these were analyzed. Hypotheses 3, 6, and 8 dealt exclusively with the question of subjects who had prior experience with cameras. The use of cameras produced a significant gain in both hypothesis 3 and hypothesis 8; and in hypothesis 6 there was also some gain, but this was not significant. Hypothesis 7 took into consideration those subjects of the experimental group who had no prior experience with cameras, but once they were provided with cameras, a significant gain in their visual perceptual ability was recorded at the end of the experiment.

On the basis of these findings and observations made during the course of the study, together with an examination of actual photographs and sketches produced by the subjects involved, it was felt that the camera did facilitate the process of recording and evaluating percepts.

CHAPTER V

SUMMARY, CONCLUSIONS, IMPLICATIONS, AND SUGGESTIONS FOR FURTHER RESEARCH

SUMMARY OF THE INVESTIGATION

The purpose of this study was: (1) to investigate the possibility of increasing the rate of visual perceptual growth; (2) to investigate whether visual perceptual exploration is facilitated by the use of the still camera and (3) to investigate whether evaluation of children's visual information is facilitated by photographs taken by the children themselves.

The sample of convenience consisted of one Grade VI class and one Grade V and VI class, with 22 and 21 participants respectively, from the Edmonton Public School System. A program of studies was designed around three areas of art learning, namely (a) visual relationship between art and man-made objects, (b) the visual as non-verbal communication: signs and symbols of the city, and (c) developing a working vocabulary for areas (a) and (b). The investigator designed a test based on these three areas of art learning. The test was made up of thirty questions distributed over one hundred and thirty-one items.

Children from the Grade V and VI class were provided with still cameras and an adequate supply of film. The subjects from the Grade VI class were allowed to use the traditional media, which consisted of pencils or crayons and manilla paper. Both groups were given the same instructions and exposed to the same learning areas which were located beyond the walls of their classroom. The test constructed was administered

by the researcher to both groups one week before and shortly after the study in an attempt to measure some changes in behaviour which might have taken place. Nine hypotheses were originally advanced in Chapter I, and with the absence of one variable, that of 'prior original art training,' Hypotheses 4 and 5 were not subjected to a statistical analysis. Table VII presents a summary of the statistical results.

TABLE VII

Hypotheses	Null Hypotheses	Values of P
1	Accepted	.33
2	Accepted	.63
3	Rejected	.01
6	Accepted	.14
7	Rejected	.03
8	Rejected	.002
9	Accepted	.29

The results of hypotheses 1, 2, and 3 in effect meant that no statistically significant difference between the camera group and the non-camera group was evident after subjects had spent five weeks receiving training for visual perception. The same held true for those subjects of the camera group who had prior experience with cameras versus those who had no prior experience with cameras. Hypothesis 3, however, was rejected when an analysis of post-test scores, on which adjustments were made for

each group to control for pre-test scores imbalance showed significant difference of means within the non-camera group, between those who had no prior camera experience and those who had prior camera experience; these differences being in favour of the latter sub-group.

Whereas Hypotheses 1, 2, and 3 were constructed to determine the change that occurred between the sub-groups over a period of time described by the spacing of the pre-test and post-test, Hypotheses 6, 7, 8, and 9 were designed to examine the changes that took place within each sub-group during the same time.

The issue fundamental to Hypotheses 6, 7, 8, and 9 was whether the camera as a medium produced any significant difference in the gains achieved by the sub-groups. In other words, did the camera facilitate the process of recording and evaluating percepts for each individual group?

Table VII shows that for those subjects in the experimental group with previous camera experience (Hypothesis 6), a gain was produced, but not a significant one. For those in the experimental group with no previous camera experience (Hypothesis 7), there was significant difference between the two mean scores. This meant that the gains produced by subjects who used the camera for the first time, was not a function of chance. Consequently, the camera helped.

With regard to those subjects in the control group who had previous experience with cameras (Hypothesis 8), a significant difference also existed between the two mean scores. It might be the case that familiarity with the camera as a medium, had provided this group with an initial advantage. For those in the control group with no previous camera experience (Hypothesis 9), there was no significant difference in mean scores.

Based on these findings, certain conclusions were arrived at, and implications for education and suggestions for further research in the area of art education are presented in the remainder of this chapter.

CONCLUSIONS

The fact that only a small distinction was found with the performance between the camera and the non-camera group, may be attributed to a number of causes. Firstly, to anticipate that some change would occur in either direction is to assume that an appreciable change would occur in perceptual behaviour over a five-week period. The statistical results of the investigation indicated that some change did occur equally with the two groups. But equal change does not necessarily mean the same kind of change. One group's response to the experience might have been a normal short-lived initial kind of response to experiencing their environment, whereas another group might have been responding in a generative self-sustaining fashion. At this point, some of the observations made during the course of the study will be brought to weigh on this matter.

It was reported in Chapter IV that children who made use of cameras to record their percepts did not only spend the time recording more percepts than the sketching group, but also engendered an interest which never waned with time. Time was also crucial for the camera group during the evaluation sessions as the 110 minutes never seemed enough. These children found in an organized setting that they were able to individualize their world and thereby make it easier to comprehend. Shutter speed and viewfinder closure provided the user of the camera with brief but invaluable moments of privacy. Given this privacy the child felt free within himself to lend meaning to his environment. Every photograph became

the child's own creation. In this process of recreating his environment visually, the child found it easier to comprehend.

Although the evaluation sessions found both groups interacting intensely, the degree of interaction cooled off considerably after the non-camera group had been examining their drawings for the first hour. For some children in the non-camera group, frustration set in early in the evaluation period, because they felt their drawings were far removed from their actual percepts. On the basis of these observations, it therefore seems that, given enough time, the growth pattern of the non-camera group would have fallen off and in all likelihood, the growth pattern of the camera group would have stabilized.

But distinctions became more clearly defined when each sub-group was analyzed separately. The camera did facilitate the process of recording and evaluating percepts of children with no camera experience in the experimental group (Hypothesis 7). Some gains were also apparent with the experimental group who had prior camera experience, but these gains were not statistically significant (Hypothesis 6).

Underlying the statistical analysis is the assumption that the test as designed by the writer, was capable of differentiating visual perceptual gains from non-visual perceptual gains. It is true that the reliability measure obtained by the Kuder-Richardson procedure yielded an adequate value of .80 and .78; however meaningful these figures may be in the world of statistics, what do they really mean in the world of interacting children involved in a creative learning process? McFee (1970) has spoken in very broad terms about the question of evaluation. It seems difficult to determine to what extent the characteristics measured by the test were representative of the characteristics of any visual perceptual

learning which might have taken place. To whatever degree the test was measuring certain characteristics of visual perceptual learning when both groups were examined separately (Hypotheses 6, 7, 8, and 9), subjects with prior camera experience seemed to have been moving in a positive direction.

Although the products (photographs and sketches) of those involved in the study revealed that the camera group made use of a variety of vantage points in recording their percepts as opposed to the non-camera group, one must exercise care in attributing this result to the recording medium (the camera) exclusively. It was not so much the camera itself, as it was the facility which the camera provided; the opportunity to focus and reduce distraction to a minimum, thereby controlling the position of the object of interest. The confidence the child places in the recording powers of the camera seems to have a reciprocal effect on his own confidence. He seemed to forget that the camera existed as a unit in its own right and adopted it as a logical extension of himself. To conclude that the non-camera group lacked any visual perceptual ability because their sketches lacked variety, would constitute a gross over simplification of the situation. It appears to be rather a case in which the traditional media failed in their function of providing the non-camera group with adequate opportunity for exercising and actualizing any of their visual perceptual capabilities.

What began as a concerted effort to elucidate and to some extent experiment in an area of visual perception, became particularly difficult, if not elusive, because the investigation was concentrated on a less conscious activity. It must be borne in mind that the peculiarities of both camera and non-camera groups described in Chapter IV were only

determined within the limits of the design of the study, not to mention the purpose. Furthermore, the same framework which permitted the investigator to describe these peculiarities was affected by his perception of the experience. It must be remembered, however, that while Arnheim, McFee, Piaget and others involved in art and visual perception continue to offer theoretical positions, researchers in art education should continue to address themselves to specific means of improving their present curriculum for art instruction.

IMPLICATIONS

Several implications for art education can be drawn from the findings presented here. Some children still leave the art class in the average Canadian Elementary School seeing no value to art. It may be that art educators have been too concerned with manipulating the external variables, feeling that all that needs to be done is to periodically change around the environment to which the child comes during school hours. But to operate on this sole basis is wrong, because for art education to change, the change must come from those people who talk about art and from those who teach it. These people must question the emphasis of the art curriculum content and the processes by which this content is acquired. Although executed on a small scale, the content design of this study and the procedure involved (i.e. using inexpensive cameras and examining photos which recorded their own percepts), reflects one dimension of art curriculum that is essential to the intellectual and emotional life of the individual.

This investigation has thrown considerable light on another avenue of learning which educators, curriculum planners, researchers and teachers

should employ in their efforts to reach the individual child. They must ensure that enough opportunity for this activity is provided within the parameters of their curriculum.

Whatever strides any of these make in the direction of developing visual perceptual awareness is important; but more important is what the classroom teacher does. The teacher is at the forefront. He or she is there where the learning is taking place. Consequently, what the teacher does must always be as a function of what the child does and not the other way around. Art has to begin with what the child looks at in his world and how he looks at it, and thus an essential feature of any art program should be that it permits the child to engage in visual inquiry, so that his reserves of idea sources can be increased. This study has re-emphasized the technological advantages of the camera in this area. The idea reserves generated by the camera can then be translated into any visual art form.

SUGGESTIONS FOR FURTHER RESEARCH

It was indicated that any investigation in the area of visual perception can be particularly difficult, since one is dealing with a less conscious activity. It appears, however, that if one were to do a similar study over a longer period of time (at least six months), it might yield more powerful results. The investigator would be able to observe more precisely the type of change taking place over the months.

More research is definitely needed in the area of a testing instrument. The construction of such an instrument should not be attempted before an extended study similar to that suggested above is completed. This guideline indicates a built-in safety precaution against omitting valuable test material which can come, and must come, from the work of children themselves. It might also prove worthwhile to undertake a study involving only students with no prior experience with cameras.

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APPENDIX A

INSTRUCTIONS TO TEACHER CO-OPERATING IN DATA COLLECTION

INSTRUCTIONS TO TEACHER CO-OPERATING IN DATA COLLECTION

INTRODUCTION

This research concerns itself with a specific area of visual perception. It explores one method by which one can help children develop highly differentiated visual percepts; ways in which they become more visually aware of their environment so that they will be constantly employing perceptual cues of observing, identifying, relating, distinguishing and discriminating. In order to make meaningful strides in visual perceptual development, one must engage in constant evaluation of one's visual information. This study tries to find out whether this kind of evaluation is facilitated by the technological possibilities of the still camera, as opposed to more traditional media and methods. An intensification of the children's perceptions of their environment is the expected outcome.

THE TASK

For the purpose of this study, I have defined two specific areas with which the subjects of both experimental and control groups must concern themselves.

AREA ONE: Lesson One: Line and Shape

The children should be engaged in looking at a variety of man-made objects and attempting to note the relationships between these objects and art.

Review briefly with children the art elements of line and shape, or form, and how these elements function.

Example 1. Line and Shape:

Simple recognition of lines and basic shapes wherever they occur as a dominant feature in the design of any man-made object (architecture, household furnishings, etc.)

Identification of line and shape in a vertical or horizontal position, or instances when these elements create patterns, textures, movement, rhythm, or when they are used in perspective.

AREA ONE: Lesson Two: Evaluation

This session should be divided into four phases. Have small groups of four to six work at individual tables.

Phase 1: Time: 30 minutes. Materials: photographs from Lesson One. Have each sub-group discuss their photographs in the terms defined in Example 1. Provide each group with a copy of these terms. Encourage children to group photographs in an attempt to establish similarities or relationships among sets of photographs.

Phase 2: Time: 30 minutes. Materials: rubber cement and construction paper. Procedure: Have children mount photographs in groups ranging from two to five photographs per 8" x 11" construction paper. Make them feel free to write any captions (in pencil) if they think it necessary. Have children place the name of the group at the back of each set of pictures. For example: Group 1, 2, 3.

Phase 3: Time: 45 minutes. Procedure: Ask each group to leave their mounted pictures and move at intervals to other tables. On examining the photo groupings on other tables, children must try to determine reasons the original group had for arranging the pictures as they did, and agree or disagree with these reasons, and think of alternative ways in grouping the photographs. Note any similarities in sets of

photographs seen before. (INTERVALS are to be determined by the number of groups.)

Formula: $\frac{\text{Time}}{\text{No. of Groups} - 1}$ = Length of time spent at visiting table.

Phase 4: Time: 15 minutes. Procedure: This time should be open for general discussion generating from all of AREA ONE.

AREA TWO: Lesson One: Signs and Symbols of the City

Procedure: Allow between 5 and 10 minutes to establish the concept of sign and symbol as something that simply stands for or represents something else. Signs and symbols should not depend on any words for making them understood. During this time also mention some categories of signs and symbols.

Example 2. Symbols of Waste, Danger, Strength, Signs Showing Direction

Invite other examples as a means of checking on how well class understands. At the end of this briefing, proceed to the location for photographing.

AREA TWO: Lesson Two: Signs and Symbols of the City - Evaluation

Procedure: Similar to procedure in AREA ONE: Lesson Two, except that in this instance a guideline for possible grouping of photographs is not provided. Have children write captions explaining the meaning of the signs and symbols.

Give no instructions whatsoever to anyone once the field session has begun. Identify and record any conflicts arising between media and object to be recorded. Should any child ask questions concerning relevant from irrelevant cues, attempt to solicit the answer from the child himself. These measures are designed to avoid imposing any adult criterion for the selection of an object for perception.

APPENDIX B

ITEM DIFFICULTY INDEX

ITEM DIFFICULTY INDEX

Item	Pilot Study	Pre Test	Post Test
1	.250	.957	.978
2	.333	.913	.783
3	.167	.304	.522
4	.250	1.000	1.000
5	1.000	.978	.978
6	.333	.913	.870
7	.417	.891	.870
8	.500	.609	.652
9	.583	.891	.870
10	.333	.804	.804
11	.083	.978	.935
12	.083	.957	.935
13	.917	.913	.913
14	.417	.739	.848
15	.250	.783	.838
16	.250	.870	.957
17	.917	.891	.891
18	.500	.609	.652
19	1.000	.957	.913
20	.167	.935	.913
21	.083	.957	.913
22	.083	1.000	1.000
23	.083	.978	.978
24	.833	.783	.804
25	1.000	.783	.870
26	1.000	.935	.978
27	.917	.978	1.000
28	.167	.957	.913
29	.833	.913	.935
30	.417	.609	.739

Item	Pilot Study	Pre Test	Post Test
31	.333	.978	.978
32	.333	.457	.543
33	.583	.174	.326
34	.833	1.000	.978
35	.583	.978	.978
36	.917	.957	.891
37	.083	.957	.978
38	.833	.978	1.000
39	.917	.870	1.000
40	.500	.652	.739
41	.833	.543	.826
42	.167	.630	.978
43	.333	.913	1.000
44	.583	.457	.391
45	.417	.891	.870
46	.750	.891	.957
47	.750	.978	.935
48	.833	.913	.848
49	.500	.717	.826
50	.583	.848	.891
51	.250	.826	.913
52	.833	.826	.848
53	.250	.739	.848
54	.667	.696	.696
55	.333	.761	.457
56	.667	.761	.543
57	.833	.891	.891
58	.583	.804	.957
59	.167	.739	.630
60	.500	.413	.565
61	.167	.652	.696
62	.167	.935	.978

Item	Pilot Study	Pre Test	Post Test
63	.417	.913	.935
64	.583	.543	.500
65	.333	.826	.848
66	.027	.587	.609
67	.250	.957	.957
68	.167	.783	.826
69	.917	.913	.913
70	.417	.913	.891
71	.917	1.000	.957
72	.667	.804	.957
73	.250	.522	.435
74	.833	.913	.848
75	.917	.783	.848
76	.167	.739	.870
77	.250	.609	.783
78	.333	.783	.957
79	.917	.783	.935
80	.583	.783	.826
81	.667	.435	.457
82	.333	.804	.717
83	.750	.674	.739
84	.500	.391	.304
85	.917	.652	.457
86	.167	.804	.826
87	.667	.304	.326
88	.333	.500	.609
89	.083	.891	.891
90	.917	.891	.978
91	.833	.652	.739
92	1.000	.957	.978
93	.750	.957	.957
94	.083	1.000	1.000

Item	Pilot Study	Pre Test	Post Test
95	.333	.109	.130
96	.250	.935	.913
97	.500	.543	.609
98	.250	.891	.783
99	.167	.935	.957
100	.917	.957	.957
101	.833	.756	.870
102	.917	.864	.913
103	.250	.909	.935
104	.917	.932	.935
105	.833	.909	.935
106	.417	.581	.609
107	.750	.651	.630
108	.417	.605	.630
109	.750	.279	.239
110	.167	.925	.889
111	.083	.800	.911
112	1.000	.950	.933
113	.500	.925	.911
114	.667	.789	.844
115	.500	.622	.689
116	.667	.676	.778
117	.583	.432	.511
118	.667	.639	.756
119	.167	.917	.889
120	.417	.556	.733
121	.250	.861	.956
122	.917	.909	.864
123	.167	.515	.432
124	.083	.909	.886
125	.333	.909	.841
126	.833	.879	.886

Item	Pilot Study	Pre Test	Post Test
127	.750	.444	.591
128	.667	.778	.545
129	.167	.704	.614
130	.750	.778	.568
131	.250	.462	.488

APPENDIX C

THE TESTING INSTRUMENT

INSTRUCTIONS

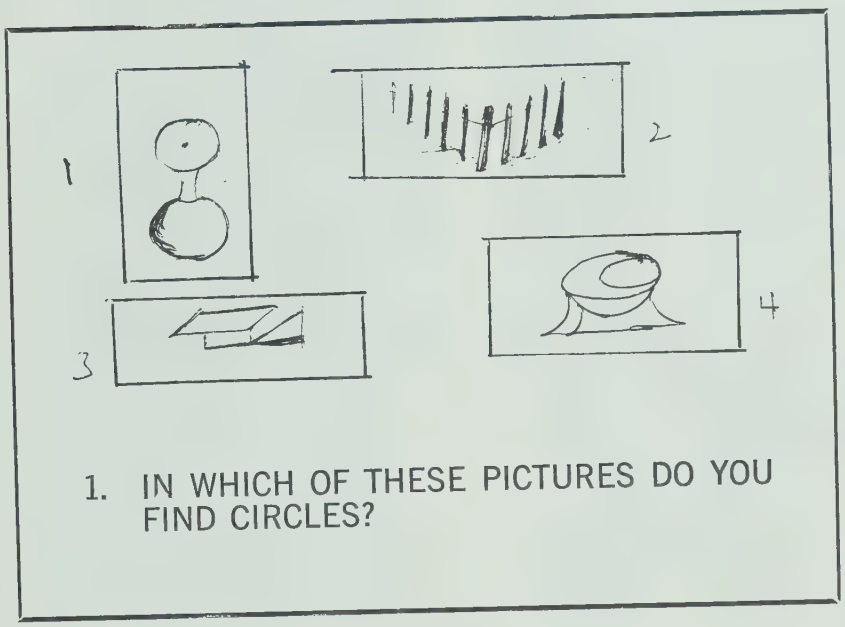
WHAT IS THIS?

This is a booklet with 30 pages and it would probably be the fastest 30 pages you have ever read. There are also 30 sets of pictures here, and I would like to find out how **aware** you are of certain **art elements** and **how these elements work** within these pictures.

HOW IS IT DONE?

Let's take a sample and see.

Your question looks like this:



1. IN WHICH OF THESE PICTURES DO YOU FIND CIRCLES?

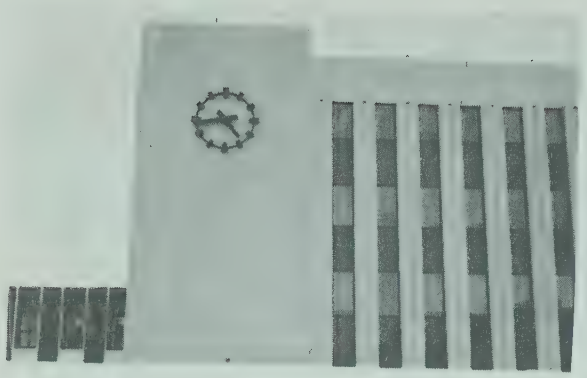
Your Answer Sheet looks like this:

QUESTION NUMBER 1

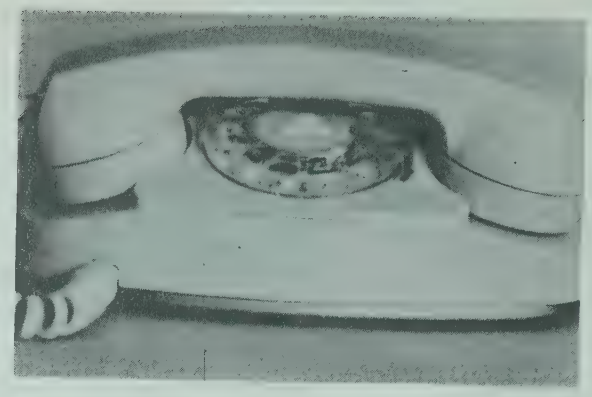
	Yes	No
Picture Number 1.	.....	.....
Picture Number 2.	.....	.....
Picture Number 3.	.....	.....
Picture Number 4.	.....	.....

Now circles can be found in number 1 and 4 so, you fill in blank in row 1 and 4 under **YES** column and in row 2 and 3 unedr **NO** Column.

1



2



3

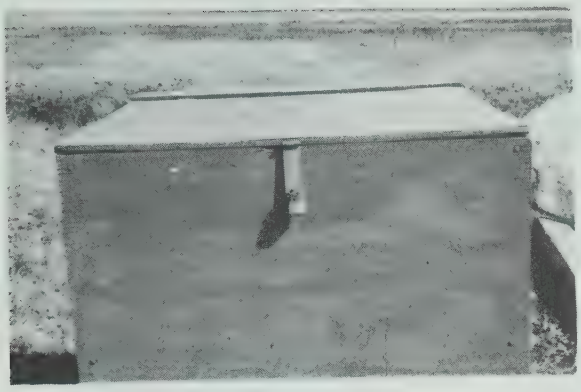
4

5

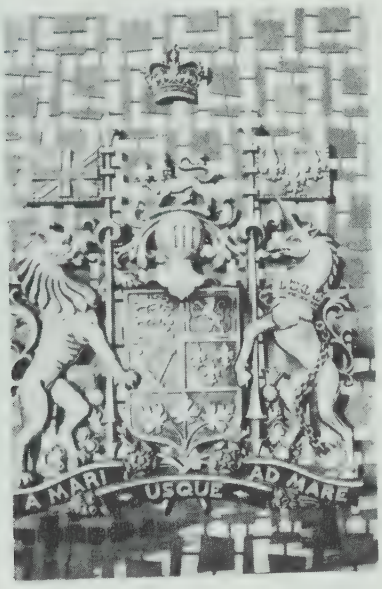
1. IN WHICH OF THESE PICTURES CAN YOU FIND PERFECT CIRCLES?

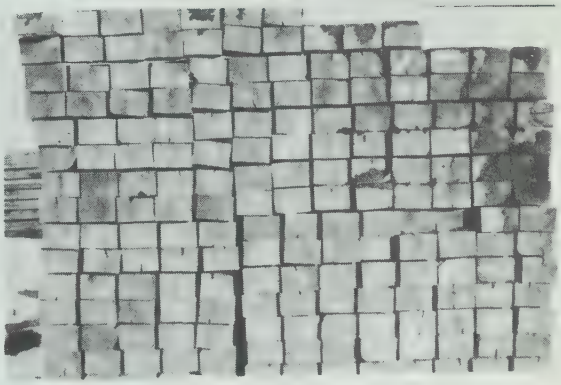
7

6



8

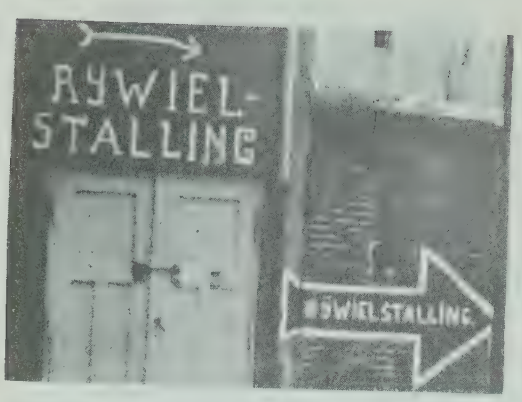




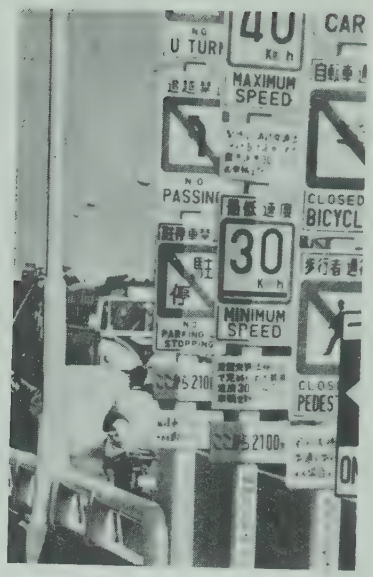
9

2 WHICH OF THESE USE RECTANGULAR SHAPES AS AN IMPORTANT PART IN THE DESIGN?

10



11

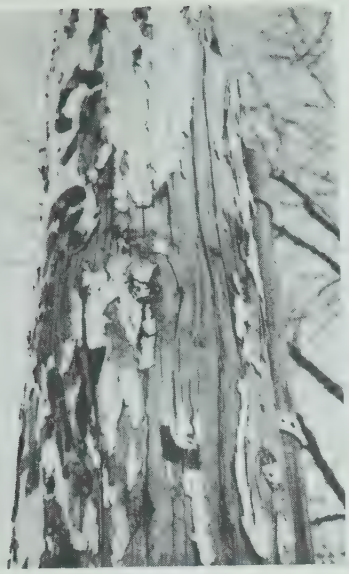


12

13

3 IF YOU WERE FOLLOWING DIRECTIONS, WHICH ONES WOULD YOU TAKE TO TURN TO THE RIGHT?

14



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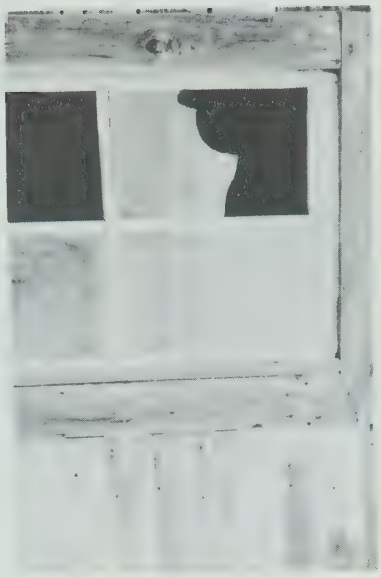
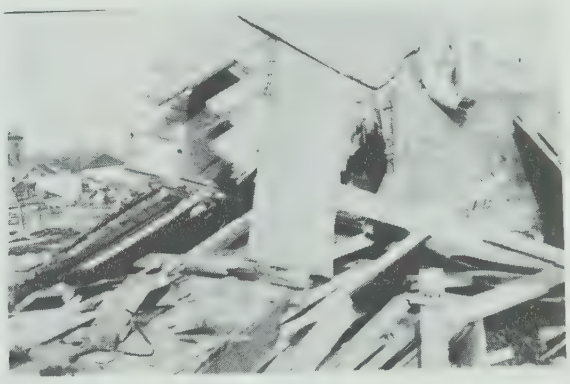


16

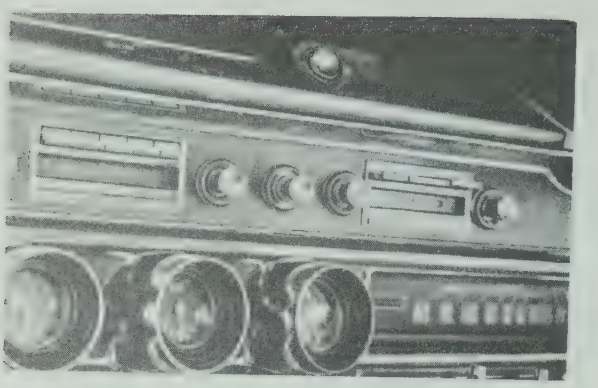


17

4 WHICH OF THESE SYMBOLIZE HUMAN DESTRUCTION?

19

18



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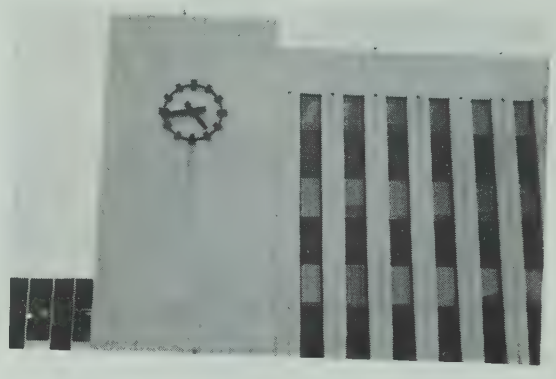


21

5 WHICH OF THESE STAND FOR OR SYMBOLIZE TIME?

23

22

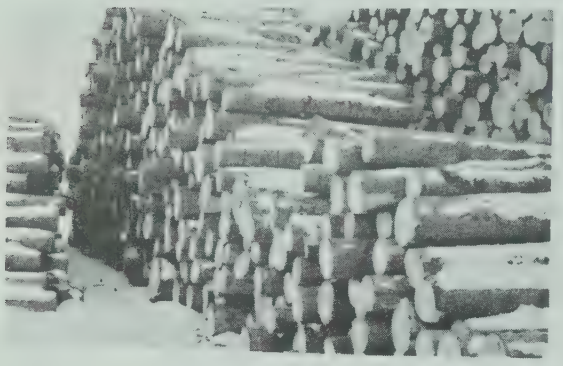
24

25

6 IN WHICH OF THESE PICTURES DO LINES SUGGEST DISTANCE?

27

28

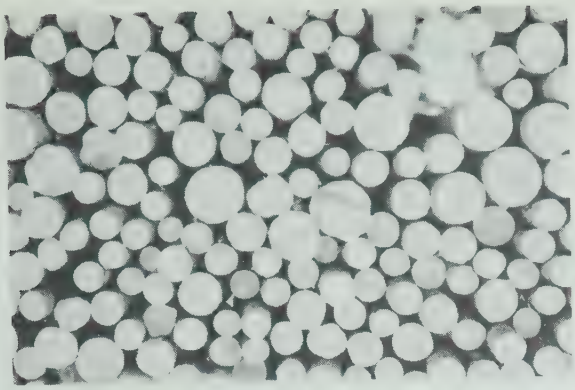


29

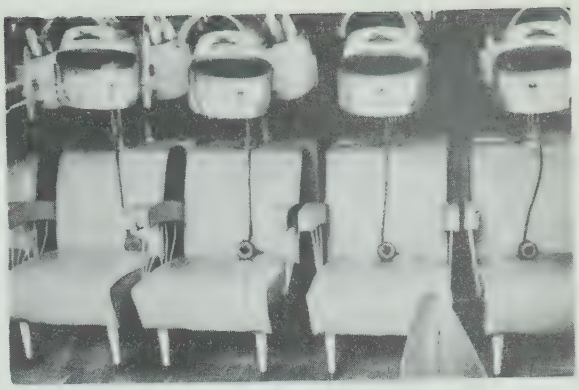
30

7 WHICH OF THESE ARE SIGNS OR SYMBOLS OF WASTE?

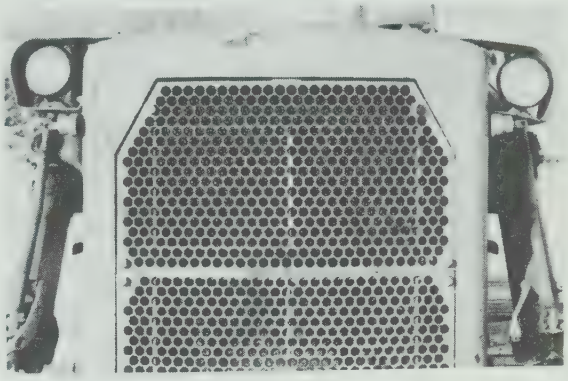
31



32



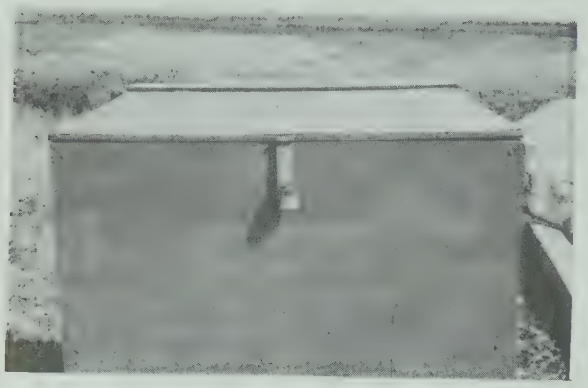
33



34

8 IN WHICH OF THESE IS THE CIRCULAR SHAPE REPEATED TO FORM A PATTERN?

35



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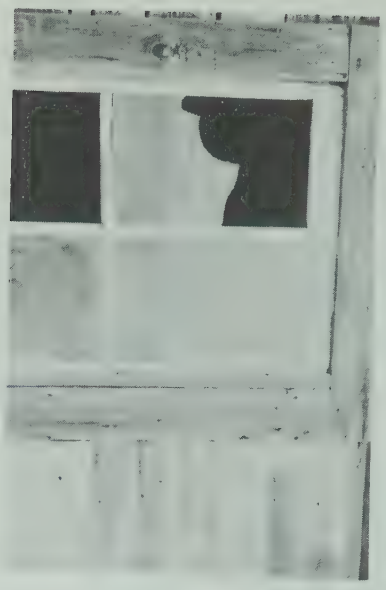


37

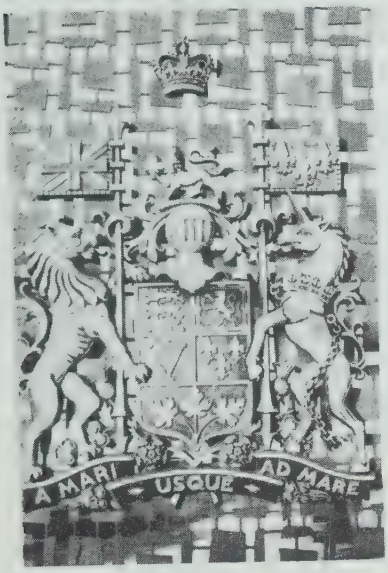
38

IF THESE PICTURES COULD TALK WHICH ONES WOULD BE SAYING "STAY OUT"?

39

40

41



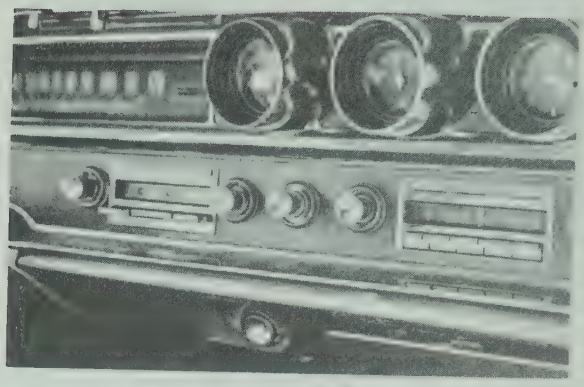
42

43

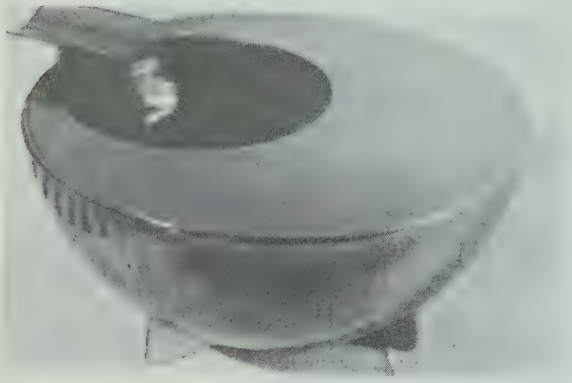
10 WHICH OF THESE SYMBOLS ARE OF AUTHORITY?

44

45



46



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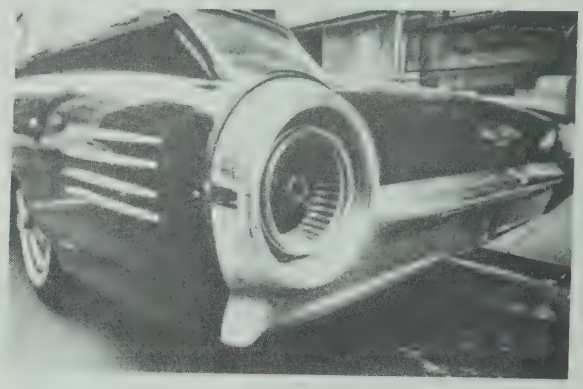
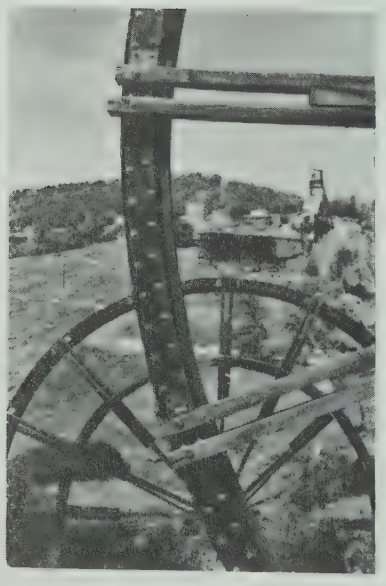




11 IN WHICH OF THESE PICTURES ARE CIRCLES OR A CIRCLE USED WITHIN A CIRCLE TO FORM PART OF THE DESIGN?

49

50

52

51

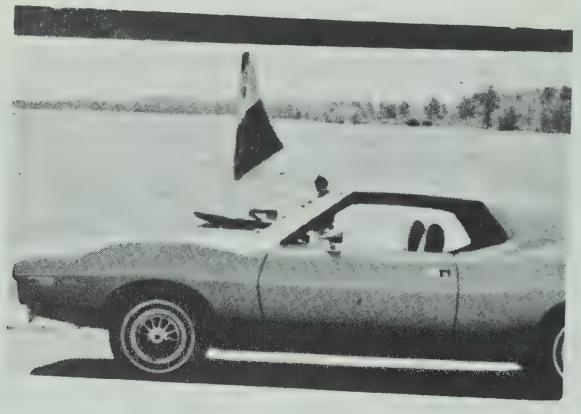
53

12 THE ARCHITECT HAS MADE STRONG USE OF LINE IN THESE BUILDINGS, WHICH ONES EMPHASIZE THE VERTICAL LINE?

54

55

56



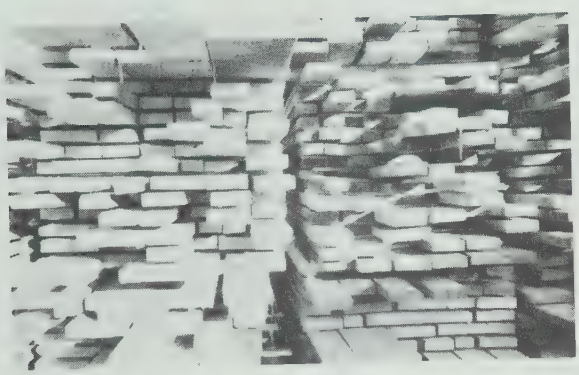
57

13 WHICH OF THESE DESIGNS IN VEHICLES SYMBOLIZE SPEED?

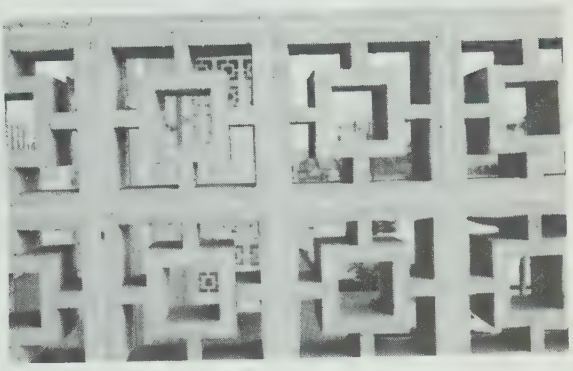
58

59

60



61



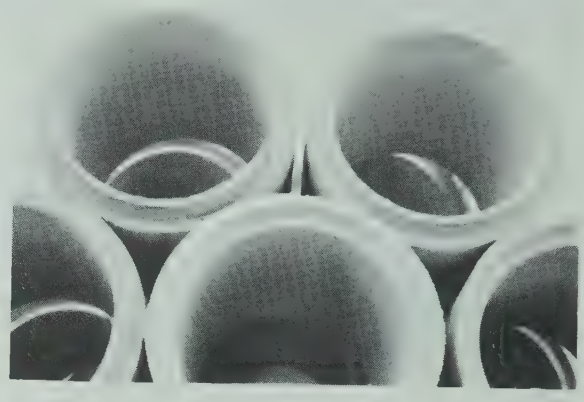
62

14 WHICH OF THESE DESIGNS MAKE USE OF THE BASIC SQUARE SHAPE?

63

64

65



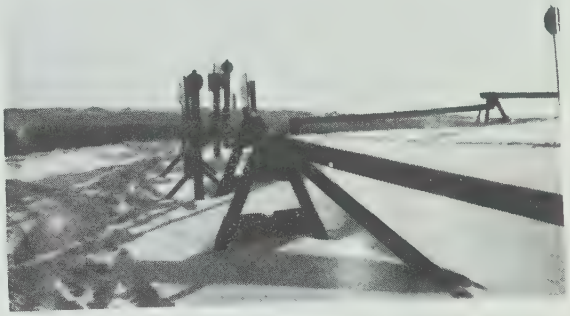
66

15 WHICH OF THESE SHOW CYLINDER SHAPES IN A VERTICAL ARRANGEMENT?

67

68

69



70

71

16 WHICH OF THESE STAND FOR OR REPRESENT OR SYMBOLIZE DANGER?

72

73

74

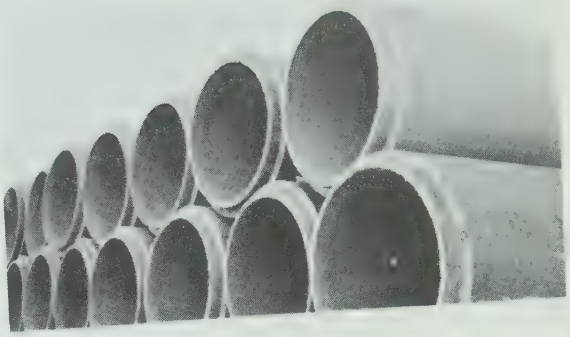
75

17 WHICH OF THESE SIGNS SAY TURN TO THE LEFT OR KEEP LEFT?

76

77

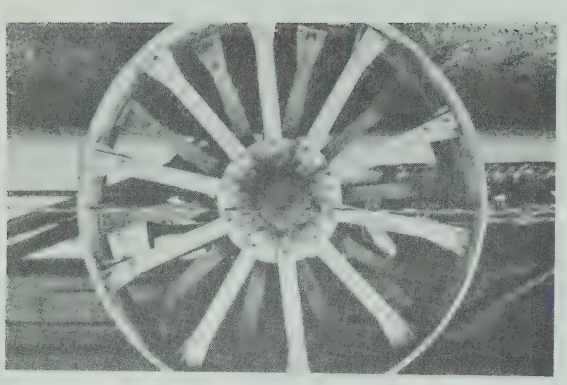
78



79

18 WHICH OF THESE SHOW CYLINDER SHAPES IN A HORIZONTAL ORDER?

80



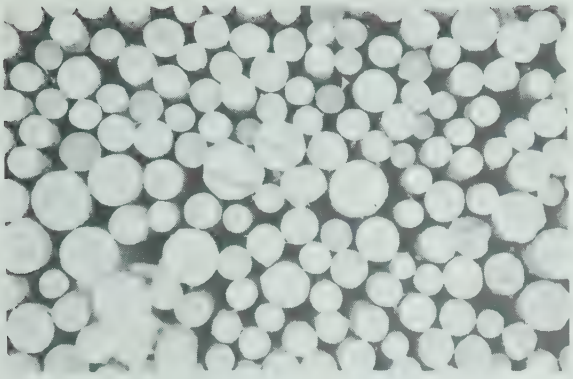
81

82

83

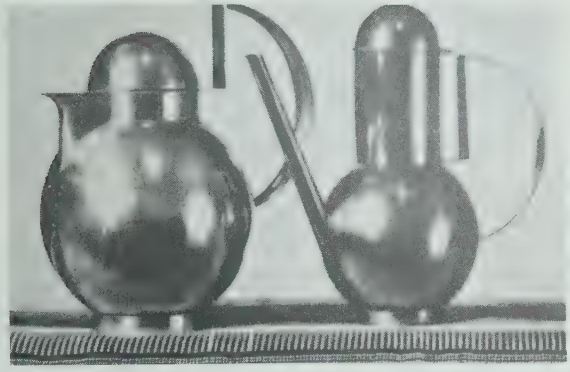
19 WHICH OF THESE SHOW LINES MOVING INTO OR AWAY FROM ONE SINGLE POINT?

84

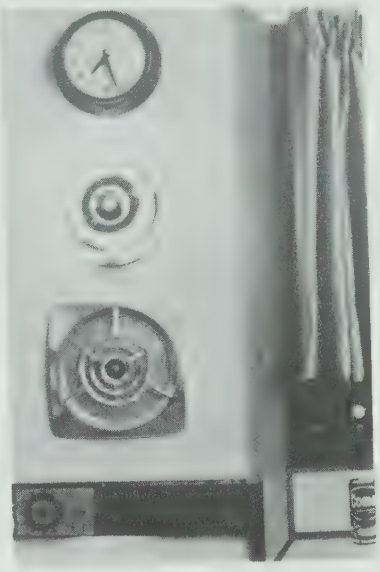


85

86



87



88

20 IN WHICH OF THESE ARE SPHERICAL (SPHERE-LIKE) SHAPES USED IN THE DESIGN OF THE OBJECTS?

89

90

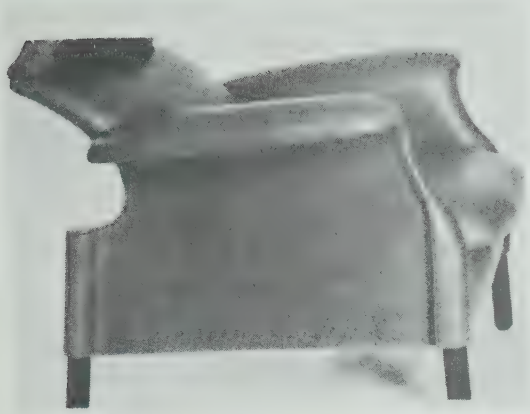
91

92

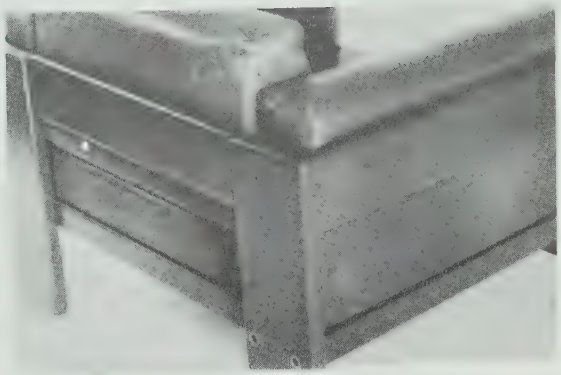
21 WHICH OF THESE PICTURES TELL YOU THAT SOMETHING IS OUT OF USE OR OUT OF ORDER?

94

93



95

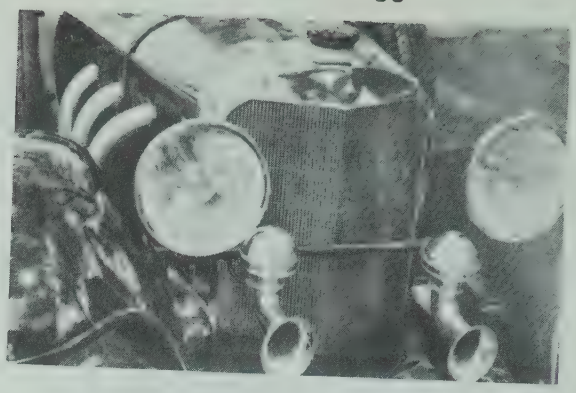


96

22 WHICH OF THESE OBJECTS ARE CHARACTERIZED BY CURVED LINES?

97

86



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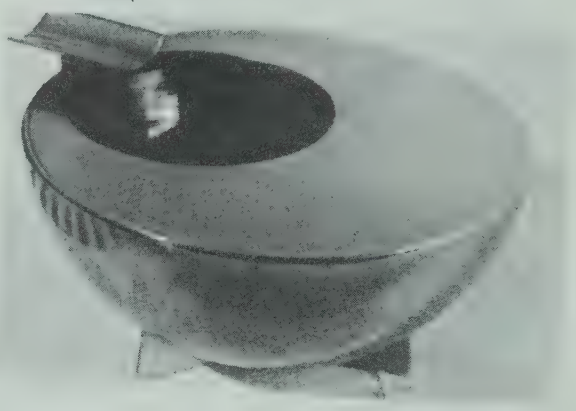
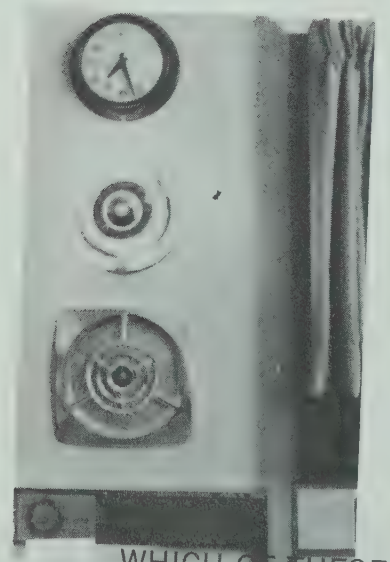


100

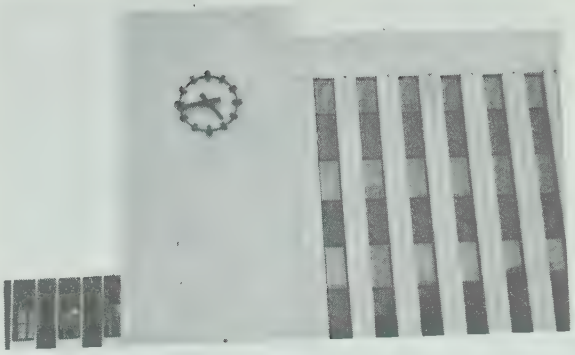
101



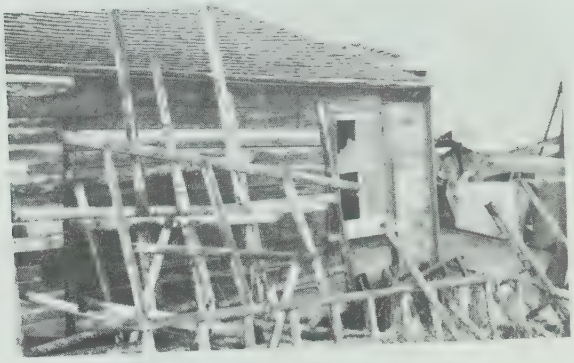
WHICH OF THESE OBJECTS MAKE MUCH USE OF
23 CIRCULAR SHAPES FOR THEIR BASIC DESIGN?

102

103



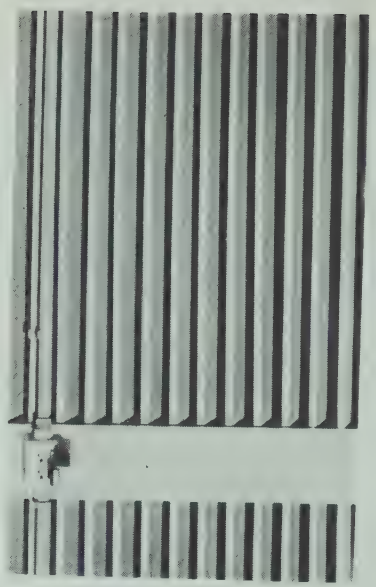
104



105

WHICH OF THESE ARE SYMBOLIC OF AGING OR DECAYING?

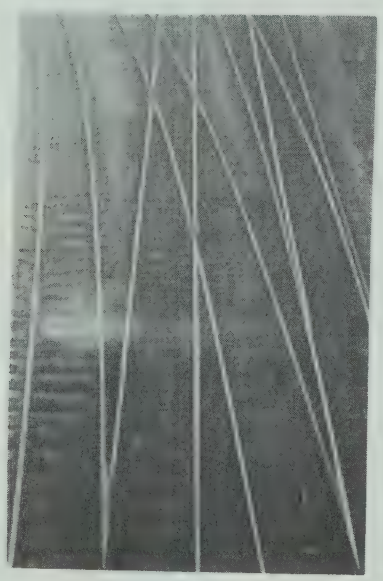
107



106

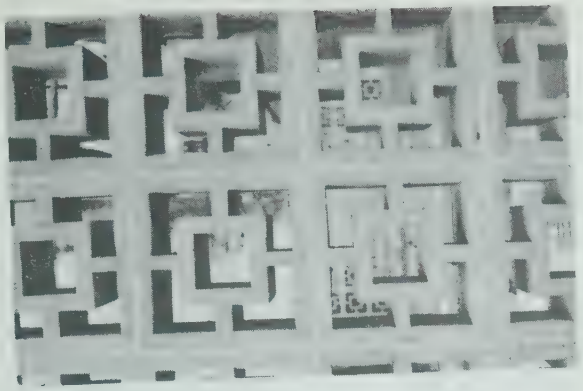
109

108



25 WHICH OF THESE PICTURES HAVE FORMAL BALANCE?

110



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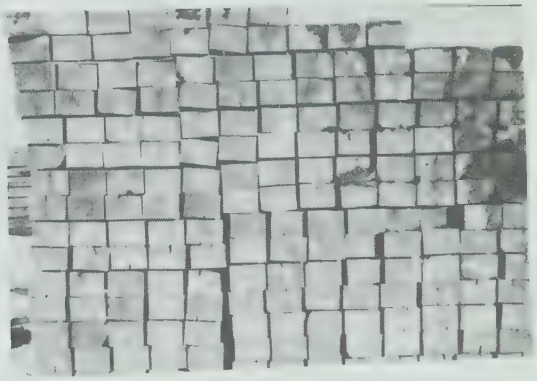
112

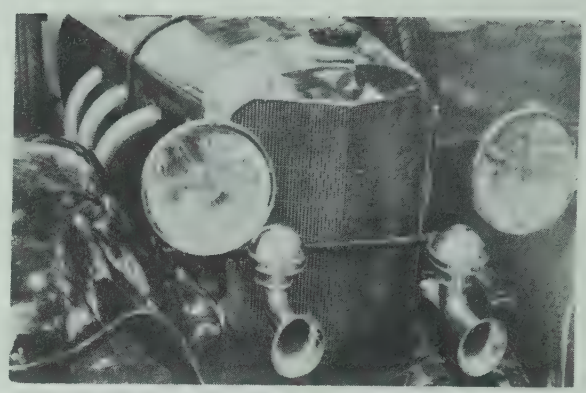


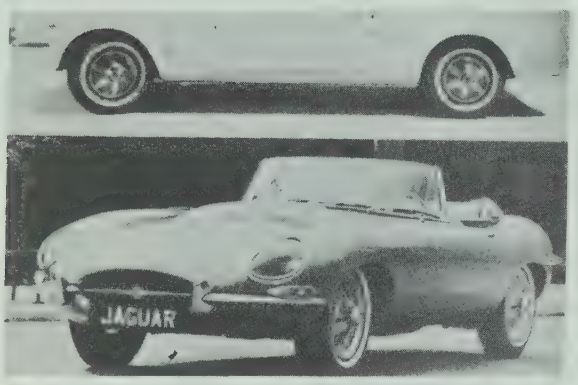
113

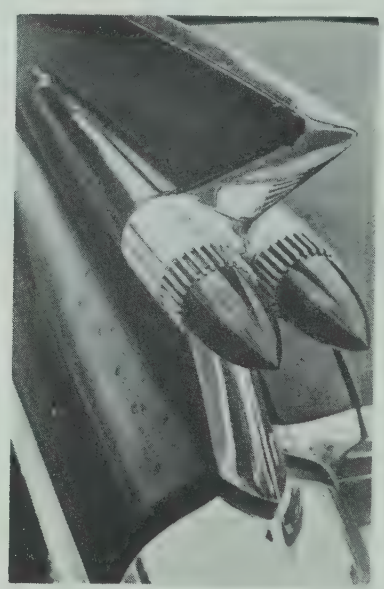
26 IN WHICH OF THESE PICTURES ARE SQUARE SHAPES OR RECTANGULAR SHAPES REPEATED TO FORM A PATTERN?

114

115

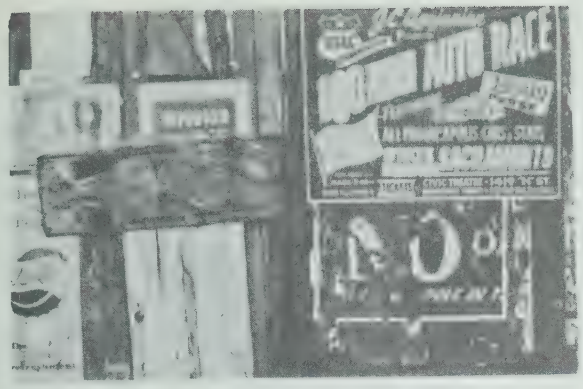






117

27 WHICH OF THESE DESIGNS IN VEHICLES CLEARLY SYMBOLIZES POWER?



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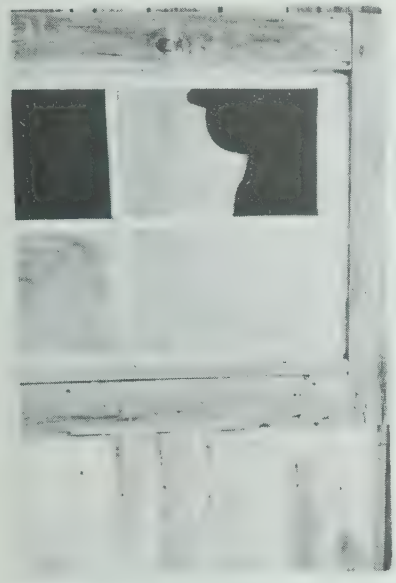
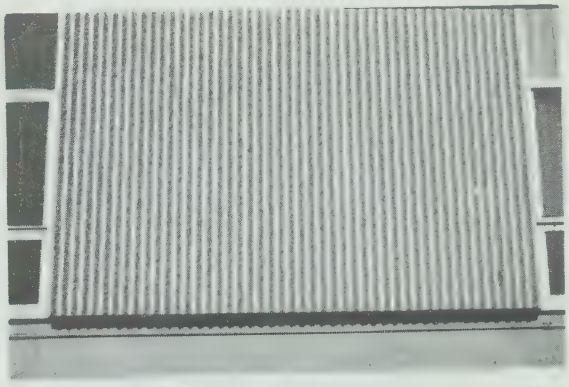
119



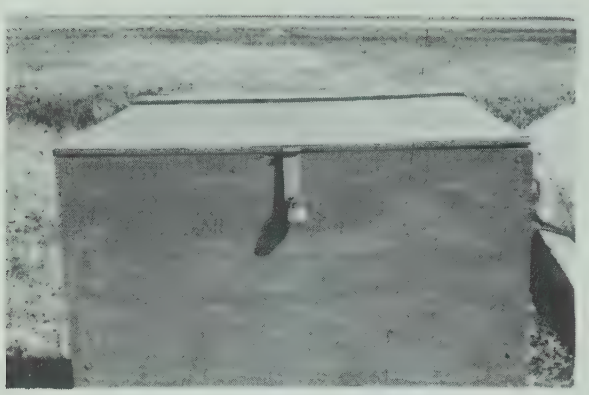
120



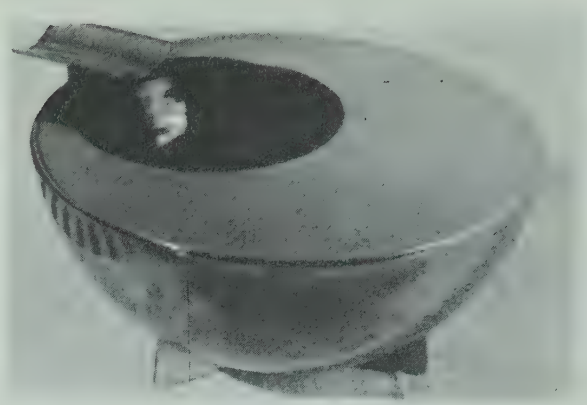
121

28 IN WHICH OF THESE BUILDINGS HAVE LINES BEEN USED TO GIVE A TEXTURAL QUALITY TO THE SURFACE?

122



123



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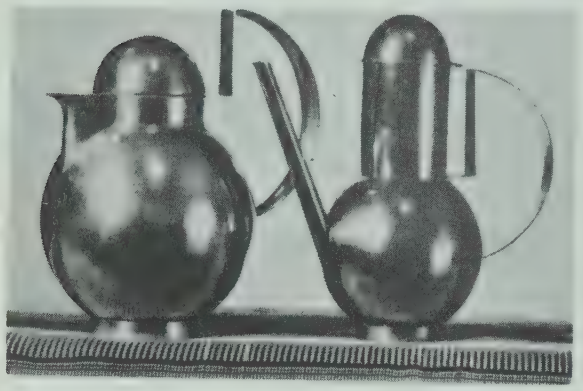
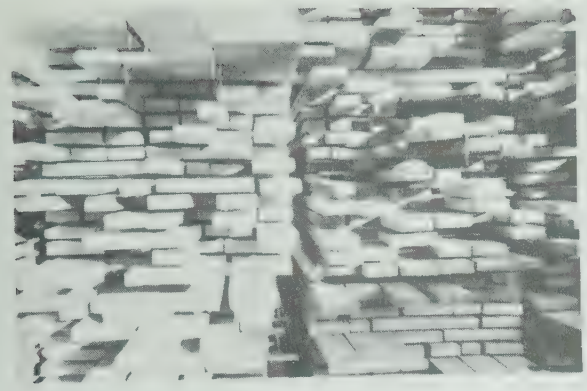


125

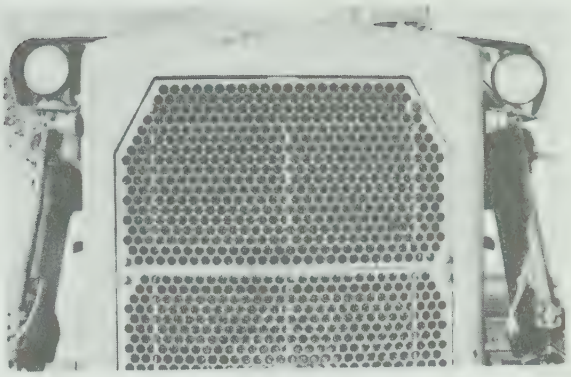
126

29 IF THE OBJECTS HERE COULD TALK AS YOU PASS BY, WHICH ONES ARE LIKELY TO SAY "DEPOSIT HERE?"

127



128



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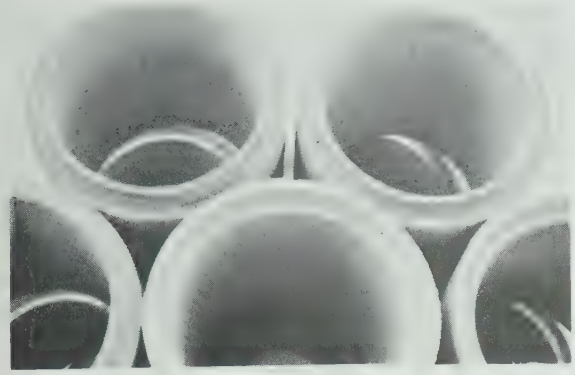

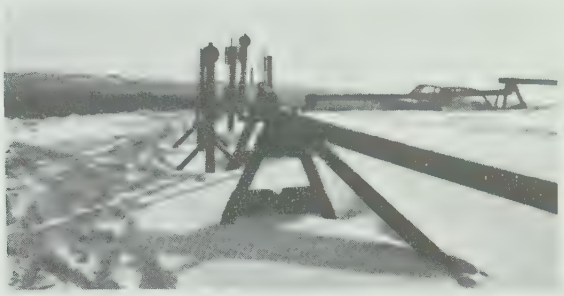

130

131

30 IN WHICH **ONE** OF THESE PICTURES DOES REPITITION OF SHAPES, AND LIGHT AND DARK COMBINED TO CREATE A FEELING OF MOTION?